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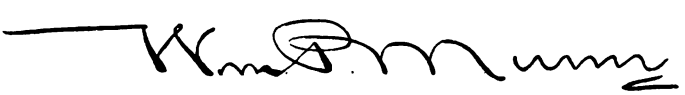

TRANSACTIONS

OF THE

COLORADO STATE MEDICAL SOCIETY

THIRTY-FIRST ANNUAL CONVENTION

BY-LAWS AND LIST OF MEMBERS

Denver, August, 1901
Published for the Society

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PROGRAM—J. N. Hall, Hubert Work, J. T. Eskridge, H. W. McLauthlin, J. A. Hart, A. T. King.

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Minutes of the Thirty-first Annual Convention of the Colorado State Medical Society, Held in Denver, June 18, 19 and 20, 1901.

TUESDAY, JUNE 18.

MORNING SESSION.

The society was called to order at 10 o'clock in the ballroom of the Brown Palace Hotel, President Wm. P. Munn of Denver in the chair.

Invocation by Rev. Charles H. Marshall.

The President: The Thirty-first Annual Convention of the Colorado State Medical Society is now in order for its regular business. Are there any remarks before proceeding with the regular scientific program?

Dr. Hershey: I move that the order of business as printed upon the program be adopted. Seconded; carried.

Dr. Love: I move that the minutes as printed in the Transactions be adopted, but not read. Seconded; carried.

The President: The first order of business is the report of the corresponding secretary, Dr. H. B. Whitney.

Dr. Whitney then reported as follows:

During the past year the society has lost the following members:

Honorary Members: Drs. W. F. McClelland and Thos. F. Rumbold—both by death.

Active Members: By death—Dr. T. K. Clark. By election to honorary membership—Drs. W. F. McClelland and W. R. Whitehead.

By resignation: Drs. M. Beshoar and Hannah T. Muir.

Dropped for non-payment of dues: Fred N. S. Ames, A. E. Bonesteel, T. J. Carlin, C. J. Ferguson, J. W. Hawk, A. Johnson, S. W. Jacobs, A. J. O. Lof, Kate R. Lobingier, A. M. Maclean, M. H. Mack, A. D. Marks, S. H. Meuer, J. W. McDaniel, D. A. McLean, P. Hyrup-Pedersen, H. W. Rover, O. R. Shippey, B. F. Stockett, C. P. Steeves.

Total loss in active membership, 26.

Twelve new members were elected at the last meeting, making the present total active membership 300.

On December 28, a communication was received from Dr. H. L. E. Johnson, chairman of the A. M. A. committee on national legislation, requesting that a delegate to the annual conference at Washington be at once appointed. The president appointed Dr. Henry Sewall, with privilege of selecting his own alternate in case he was unable to attend.

During his report Dr. Whitney read a communication from Dr. W. M. Strickler. Dr. Strickler requested that he be allowed to tender his resignation as a member of the Colorado State Medical Society.

The President: The communication of Dr. W. M. Strickler, formerly president of this society, is before you for consideration.

Dr. Work: I move that as Dr. Strickler has for more than twenty years been a member of this society he be made an honorary member of the Colorado State Medical Society. Seconded; carried.

Dr. Strickler was then elected an honorary member of the society.

Dr. Whitney then read a communication from Dr. Johnson, chairman of the committee on national legislation of the American Medical Association.

It was moved by Dr. Edson that this letter be referred to the committee on by-laws, to be reported upon at some subsequent session of this meeting. Seconded; carried.

The secretary read a letter from the commissioners of Lake county in reference to the disposition of dead bodies of paupers from that county, and placing them at the disposal of the society, for the purpose of dissection.

Dr. Whitney: I make a motion that this matter be referred to a committee of the Professors of Anatomy from each of the three schools in this state. Seconded; carried.

An invitation was read from the Mississippi Valley Medical Association to the members of the society.

The President: The next order of business is the report of the treasurer, Dr. Wm. J. Rothwell.

Dr. Rothwell submitted his report as follows:

To the Officers and Members of the Colorado State Medical Society:

Gentlemen—As treasurer of your society I beg leave to submit the following report, for the fiscal year ending June 16, 1901:

Cash balance from last year	$ 349 38	
Receipts during the year	1,130 63	
		$1,480 01
Total expenditures	$1,123 23	
Balance on hand	356 78	
		$1,480 01

Signed,

WM. J. ROTHWELL, Treasurer.

It was moved and seconded that this report be referred to the finance committee for consideration. Seconded; carried.

Dr. Hershey, chairman of the executive committee, moved that all papers be limited to fifteen minutes, except the addresses and those in the Symposium on Diseases of the Kidney.

Dr. Jayne moved as an amendment to this motion that discussions be limited to five minutes, and that members be re-

quested not to ask for any extension of time, all being treated alike. The motion as amended was carried.

The next order of business was the report of the publication committee, by Dr. H. B. Whitney, chairman.

Dr. Whitney then submitted the following report:

The edition of the Transactions for 1900 numbered 425 copies of 446 pages each. This was from the press of the Smith-Brooks Printing Company at a cost of 90 cents a page, amounting to $401.40. Additional items of $3.50 for engraving and $12 for labels and wrapping made the total cost of publishing $416.90, to which must be added about $25 for delivery. Your committee regard the volume as a creditable one and as fully maintaining the reputation of the publishers for doing excellent work. The suggestion may here be made that the work of the publication committee will be greatly facilitated if all papers are handed to the recording secretary as soon as read, and if later all proof of papers and discussions is promptly corrected and returned.

H. B. WHITNEY, Chairman.

This report was accepted and placed on file.

In the absence of the chairman, Dr. P. J. McHugh, the report of the finance committee was not read.

The next order of business was the report of the committee on ethics, by Dr. J. M. Blaine, chairman.

Mr. President and Members of the Colorado State Medical Society:

Your committee on ethics has not been called on during the past year to exercise its prerogative in the trial of anyone for a violation of the code of ethics. This fact is an indication that the members of this society are high-minded and honorable men and women, and, while this is certainly a matter for professional gratulation, there is a matter on which your committee would like to sound a note of warning. Guard well the secrets of your patients. They are too sacred for publication in the daily prints, and, while the details of a simple operation or the exhibition of a new-fangled remedy might whet the appe-

tites of a certain portion of the reading public, it adds nothing to the advancement of scientific medicine.

Respectfully submitted,

J. M. BLAINE, Chairman.

Report accepted and placed on file.

Dr. Jayne moved that the report of the committee on by-laws be made to-morrow, Wednesday morning, at 9 o'clock. Seconded; carried.

The President: The next order of business is the report of the committee on sanitation. In the absence of Dr. McLaughlin, chairman, this report will be read by Dr. Edson.

The report was as follows:

Mr. President and Members of the Colorado State Medical Society:

Your committee on sanitation desires to make the following report:

As to communicable diseases, small-pox and scarlet fever have been and still are unusually prevalent throughout the state. During April, 1901, 562 cases of scarlet fever and 450 cases of small-pox were reported to the State Board of Health. For May, the report was 501 cases of scarlet fever and 225 cases of small-pox. Undoubtedly the fact that many of the cases of small-pox have been unusually mild, partly explains why this disease has remained so prevalent in the face of a general crusade of vaccination. But many physicians believe that the quarantine methods of some local health boards have been too lax, especially as to time of detention of the cases. The medical profession, however, is not entirely blameless, in that it does not put forth more united and better organized efforts to secure the appointment of only those best qualified for health officers, and for the more subordinate positions, as well as to secure more adequate compensation for such officers.

Typhoid fever, fortunately, did not prevail extensively duing 1900, excepting in some parts of northern Colorado. An elaborate investigation of the epidemic at Fort Collins was made

by the bacteriologist of the State Board of Health, the cause being found by him to be in the water supply. Indeed, one of the most important subjects in sanitation here is the question of the pollution of the streams and rivers. The tendency to sudden increase in population and the peculiar topography of the country both tend to increase the danger of the sources of water supply becoming contaminated.

It is not strange that in so young a state extended systematic investigations as to the composition and potability of the various waters have not yet been made. Nevertheless, considerable has already been done in this matter by the State Board of Health, considering the limited amount of money at its disposal for this work.

Analyses have been made of the water supplies of quite a number of cities and towns in the state, and a bill to provide for an extended and systematic investigation of the streams and rivers of the state, such as has been made in Massachusetts, Connecticut and others of the older centers of population, failed to receive the requisite number of votes in the last legislature. Efforts in this line should be continued.

The pollution of comparatively small streams by the sewage of large towns and cities, as the city of Denver now pollutes the Platte River, is a sanitary problem which Colorado must soon deal with. Broad irrigation from the sewage will probably furnish the solution, as it is a region dependent on irrigation.

Your committee heartily commends the State Board of Health fo rthe work accomplished during the year. The aggressive efforts of this board are refreshing. On its recommendation an improved mailing-case for forwarding diphtheria cultures to the bacteriological laboratory has been secured from the United States Government. Special precautions were employed to guard against the introduction of the bubonic plague into the state during its recent outbreak in California, and special work was done by the bacteriologist of the board in the direction of diagnosis. A few suspected cases did occur in the state, but an investigation by the board proved the alarm unfounded.

It is to be hoped that the printed bulletin now being published monthly by the board, and which contains the number of cases of scarlet fever, diphtheria and small-pox in all the counties of the state reported to the board during the preceding month, can be continued, and its circulation made more general. Every physician practicing in the state should receive it. By this means the profession can be kept informed of the status of contagious diseases throughout the state and its more earnest co-operation secured.

The obtaining of needed sanitary legislation is always difficult and slow. We have hitherto held that it could not come faster than the advancement of the education of the people in sanitary matters under the leadership of physicians. A somewhat new theory was advanced by Surgeon General Wyman in his address before the Pan-American Medical Congress in Havana, last February. His subject was "Sanitation and Progress." Under the heading of "Who Should Be Sanitarians?" he said as follows:

"In the sanitary progress of the new century it has occurred to me there must be developed new classes of individuals in sanitary affairs. To-day every physician is considered, in a sense, a sanitarian; then there are the professional sanitarians, represented chiefly by those holding sanitary office; but there are very few men to-day engaged in legislation who give any thought to sanitary legislation. We need a class of men who are versed in law, who are skilled in framing laws, and who are familiar with the difficulties and methods of securing their enactment. The average doctor or sanitarian is as a child in these matters. Impressed with the importance and nobility of his cause, he becomes oblivious to the sentiments or even the rights of those affected unfavorably thereby. The same influences which seem to make the doctor a poor man of business, seem to make of the average sanitarian a poor man for legislation. So that it seems to me, at least in the United States, it will be necessary in the development of the ideal sanitary legislator to look for him among the lawyers rather than among the physicians. There is no reason why a good lawyer should not become an adept in

sanitation. I believe it to be more difficult for a good doctor to acquire legislative wisdom."

Judging from our own legislative experience in Colorado, is there not much sense in the ideas advanced by Dr. Wyman above? Respectfully submitted,

H. W. M'LAUTHLIN,
H. L. TAYLOR,
PHILIP HILLKOWITZ,
P. E. SPRATLIN,
Committee.

This was accepted and placed on file.

The President: The next order of business is the report of the committee on necrology, by Dr. C. A. Powers.

Dr. Powers submitted the following report:

During the past year, three members of our society have been removed by death: Dr. W. F. McClelland and Dr. John K. Clark, of Denver, and Dr. T. F. Rumbold, of St. Louis.

Dr. McClelland and Dr. Rumbold were honorary members of the society, while Dr. Clark was on our active list. All were physicians of marked ability and strict integrity, prominent in the communities in which they lived. Dr. McClelland was president of the society in 1873, and in 1876 was chosen treasurer of the society, holding the latter position for seventeen consecutive years. For years he was connected with the American Medical Association and with the Denver and Arapahoe Medical Association. He was born in Ohio, May 29, 1821, being graduated in medicine from the Jefferson Medical College in 1849. After five years practice in Ohio, he removed to Council Bluffs, Iowa, where he speedily became known as one of the most skillful surgeons and physicians in that state. While in Council Bluffs he did one of the earliest Cæsarean sections on record, saving both mother and child. This operation was done in 1857, the history of the case being published and republished throughout the medical world. It reflected great credit on the operator's judgment and skill. During his life in Denver, Dr. McClelland was prominent in all good works, being known not

only as a skillful and accomplished physician, but as a man of honor and as a trusted friend. He was one of those who ever reflect credit on our profession.

Dr. T. F. Rumbold was a nose and throat specialist who had gained an enviable reputation both at home and abroad.

Dr. W. F. McClelland.

Dr. John K. Clark was born August 13, 1830, in Franklin County, Indiana. He removed to Livingston County, Mo., in 1840, and lived there until September, 1888, when he came to

Denver. He was graduated at the Missouri Medical College and was a member of the Denver and Arapahoe Medical Society, Colorado State Medical Society and the American Medical Association. Dr. Clark was an agreeable gentleman and a capable practitioner. He will be greatly missed by all who knew him.

C. A. POWERS, Chairman.

This report was accepted and placed on file.

It was moved and seconded that a full-page portrait of Dr. McClelland be published in the proceedings, and that the remarks of Dr. Stedman be reported in full in the Transactions of the society. Seconded; carried.

Dr. Hall: Mr. President, an honored member of this society, at his home in Greeley, has recently felt, in a long and painful illness, that lingering weight of the leaden hand of affliction which, for a generation, he has endeavored to mitigate for others. I know that his thoughts are with us to-day, for one who has attended almost every meeting of this society could not but note the hour.

Many of us have profited by the ripe wisdom he has accumulated in an experience of unusual fulness; many of us have been blessed by his unshakable friendship. Seventeen years ago he was our president; he has served with credit upon the State Board of Health, the State Board of Medical Examiners, the Board of Trustees of the State Normal School, and in many other positions of trust in Colorado. He was vice-president, in 1893, of the American Medical Association, and is a member of many other societies.

It is altogether fitting that in his hour of distress we should remember him, and offer him our sympathy. He has with him, to be sure, in the long watches of the night, the memories of the love of a thousand faithful friends—such friends as only so strong a personality may possess—for whom he has done so much; and he has the lasting comfort—how great it must be to him, only those of us who know him intimately may judge—which comes to the soldier who feels that he suffers because, in the freshness of youth, he gave the best that was in him, in field and in dungeon, in her time of sorest need, to his country.

Let us add another to these solaces of his weary hours. I move you, Mr. President, "that this society send its heartfelt greetings to Dr. Jesse Hawes of Greeley, and to his loving wife; that we rejoice that the lightening of his burden permits him to resume, in a measure, his accustomed habits, and permits us to hope that he may meet with us many times in future; and that we earnestly wish him a speedy and complete recovery."

I ask the adoption of this motion by a rising vote.

The President: You have heard Dr. Hall's motion in regard to forwarding a telegram to Dr. Hawes. The motion is carried, and it is so ordered, that the secretary will communicate the substance of this motion to-day by telegraph.

In answer to the telegram of sympathy sent by the secretary, the following was received:

"Greeley, Colo., June 18.

"State Medical Society, Brown Palace Hotel, Denver, Colo.: Your message of sympathy is more precious than pills or paregoric. I hope I may be with you next year. Most cordially, JESSE HAWES."

The report of the committee on legislation was not read, owing to the absence of the chairman.

The President: The next order of business is the report of the committee on medical societies, by Dr. A. S. Lobingier, chairman.

Dr. Lobingier then submitted the following report:

Letters were mailed to the secretaries of all the societies known to be organized in the state. If any were overlooked it was certainly not intentional. Responses were received from ten county societies and from three affiliated medical clubs or orgarizations:

Dr. George W. Holden, secretary of the Denver and Arapahoe Medical Society, reports:

Number of meetings held in 1901	15
Average attendance	43
Present membership	185
Gain or loss of membership in 1901	—3
Number of papers read	20
Number of addresses given	18
Number of cases presented or reported	50
Number of specimens presented	5
Number of new instruments shown	11
Number taking part in discussions	63

Dr. E. B. Queal, secretary of the Boulder County Society, makes the following report:

Members in good standing	18

Number of meetings and papers read, not given. The society is in a more flourishing condition than in former years.

El Paso County reports, through Dr. F. L. Dennis, as follows:

Number of members	42
Number of meetings for 1901	6
Number of papers read for 1901	4
Average number of visitors present	5
Increase in membership for 1901	6

Lake County reports:

Number of members	20

Dr. Sol. G. Kahn, the secretary, speaks of the good influence of the society in Leadville, and, although regular meetings are not held each month, the papers read and the spirit manifested are excellent.

Dr. P. J. McHugh, secretary of the Larimer County Society, gives the following report:

Number of members	12
Number of members in State Society	6
Number of new members	4

A symposium was held on "Pneumonia" and papers and discussions on "Menstruation," "La Grippe" and "Typhoid Fever" during the year.

The meetings are well attended and all is harmonious.

Las Animas County reports, through its secretary, Dr. James G. Espey, of Trinidad, as follows:

Number of members..... 23

The society holds regular meetings (monthly?), with a good interest manifested.

Dr. Frank Finney reports for Otero County Society:

Number of members..... 20

Average attendance 10

These meetings are regularly held. Much interest is manifested in them, and the papers read at them are good.

Pueblo County Society reports:

Number of members..... 39

Number of meetings, twice a month, on the first and third Tuesdays.

The average attendance is about twelve members. Dr. H. H. Black is secretary, and the interest and spirit of the Pueblo society is the very best.

Teller County reports, through Dr. B. B. Frankle, for the Cripple Creek District Medical Society:

Number of members..... 44

The small-pox epidemic has constituted the chief topic of discussion at the meetings held, although a liberal variety of subjects of medical and surgical interest have been treated of in the regular meetings held. Interest and harmony is good.

Dr. J. K. Miller, of Greeley, reports as follows, for the Weld County Society:

Number of members..... 10

Meetings are held the last Monday in each month. The work of the year has consisted of one or two papers from members at each meeting, together with reports of special and interesting cases. At the past few meetings the subject of a county hospital has received much discussion. Plans have also been considered whereby a stricter quarantine may be secured in contagious diseases.

"We are alive and doing pretty good work."

The following clubs and associations, working in sympathy with the county societies, make report:

The Denver Clinical and Pathological Society has a limited membership of 40.

The waiting list is now unusually large. No society in the city probably shows a more vigorous development and enthusiastic attendance.

Papers are forbidden, and only cases and specimens of especial interest and rarity are reported or exhibited. The attendance averages about 30. Meetings are held monthly. Dr. F. W. Kenney is secretary.

The Denver Clinical Society reports, through its secretary, Dr. M. Jean Gale, as follows:

Number of members	13
Number of members in Arapahoe County Society	5
Number of members in State Society	1

Dr. Edward F. Dean, secretary of the Denver Medical College Alumni Association, reports a membership of 177, 45 of whom reside in Denver. Meetings are held once a month during the college year. During 1900-'01 eleven papers were presented, twenty-five cases reported and thirteen specimens exhibited. The average attendance at these meetings was twenty.

The foregoing represent all the societies which answered the letters of inquiry sent out to the various medical associations in the state.

Respectfully submitted,

A. STEWART LOBINGIER, Chairman.

This report was accepted and placed on file.

The President: You have heard the report of the committee on medical societies. This report assumes especial importance at this time, inasmuch as in the reorganization of the American Medical Association each state society is entitled to one representative to the house of delegates. There are new rules regulating this matter.

Dr. Jackson submitted the following report:

The meeting of the American Medical Association for 1901 was attended by a dozen members from this state, and Colorado's claims to the honors of the association were recognized by the election of Dr. W. W. Grant as one of the trustees of the association, and Dr. J. T. Eskridge as chairman of the section on Nervous and Mental Diseases. The meeting was an extremely important one in the history of the association by reason of the changes effected in its organic law.

Regulations were adopted restricting to thirty-five the number of papers to be read before any one section at an annual meeting, requiring all papers to be placed in the hands of officers of sections when read, excluding from publication any paper read by title, unless its author was present and prepared to read it; and excluding from the Journal all papers not endorsed as worthy of publication by every member of the executive committee of the section in which it was presented. It is believed that these changes will improve the character of the papers presented to the sections, secure their more prompt publication, and save space in the Journal for additional original papers that will greatly add to its value.

The report of the committee on reorganization was submitted to the larger committee, composed of a representative of each state. On this larger committee, Colorado, in the absence of the President of the society, was represented by Dr. W. W. Grant, appointed by the President of the American Medical Association. This larger committee endorsed the report and submitted it to the first session of the Association. It was then referred back to the executive committee of the Association with the larger committee representing the various states, and a time set for the hearing of all objections or suggestions regarding it. At this hearing the joint committee made some minor amendments and reported it back to the session of the Association on the second day, with a unanimous recommendation that it be adopted. The Association then proceeded to adopt it without a division, and the constitution and by-laws as published in the Journal for June 8, 1901, are now the organic law of the As-

sociation. The changes thus effected in its organization are few, but extremely important. They refer chiefly to the house of delegates. As heretofore, all members of State Medical Societies and affiliated local societies may, by application, certified by the officers of such societies, become permanent members of the American Medical Association. Such permanent members have full rights of participation in the general sessions of the Association. They may also attend the meetings of the house of delegates, but can only participate in its proceedings upon formal invitation of that body. If in attendance at the annual meetings, the permanent members are eligible to all offices of the Association, and, under the constitution and by-laws, they have full control of the sections.

The house of delegates will be the legislative and business body of the Association. It will elect all the general officers of the Association, the members to deliver addresses and the Judicial Council, hereafter to consist of but nine members. It will appoint the nominating committee, which will hereafter consist of but nine members, and the standing and special committees will generally report to it. But members of the house of delegates are ineligible to the offices of the Association. This house of delegates will be composed of two delegates elected from each section of the Association, one each from the Army, Navy, and Marine Hospital services, and one delegate from each state and territorial medical society, and one additional for each 500 members of such society. Each state society is also authorized to appoint alternates to represent it in the absence of its delegates, and, should both delegates and alternates be absent, the permanent members present at a meeting shall choose representatives for their state. These delegates and alternates are each elected for a period of two years, and where two or more delegates are to be elected from one state, as near as may be, one-half are to be elected each year.

Proper provision for the representation of Colorado by the election of a delegate and an alternate must be made at this meeting. As matters now stand, this is all the representation that the 900 regular physicians of Colorado are entitled to in

the American Medical Association. That such a situation would be created, was clearly understood by those who favored the reorganization of the A. M. A. It was the deliberate intention to offer a strong inducement for the extension of state medical societies. Experience has shown that the policy of uniting the great mass of the profession of a state, in a state medical society, tends to unify the profession, increase its influence, raise its *esprit de corps,* favors local medical organizations, and proves in every way beneficial. It is for this society now to seriously consider the situation presented in Colorado, and take such action as may be necessary to render our state society truly representative of the whole profession. When this is done we shall be entitled to at least two and possibly three delegates in the house of delegates of the American Medical Association.

Respectfully submitted,

EDWARD JACKSON,
Chairman of Delegation.

The President: The members of the society have heard Dr. Jackson's report. Are there any remarks?

Dr. Jackson: The matter of the necessary change in the by-laws should be referred to the committee on by-laws, and this committee be enlarged for the purpose by the appointment of one member from each county in the state represented at this meeting. I would make that as a motion.

Dr. Whitney: I would like to inquire if there was any change in the number of delegates, as provided for in the original report of the committee on reorganization.

Dr. Jackson: One of the changes that was made was the striking out of that clause making the Presidents of the State Societies *ex officio* members of the house of delegates. All members of the house of delegates from the state societies must be directly elected. Those two changes were the only changes that were made. As it stands, we will have only one delegate.

The President: It is moved and seconded that the committee on by-laws shall be temporarily enlarged by the addition of one member from each county represented at this meeting.

Dr. Jackson: Mr. President, in explaining my motion to enlarge that committee, I would say that the problem that this committee has to deal with is an extremely important one. The result we want to effect can only be effected by some radical changes in the organization of the State Society. Those changes will be felt by the County Societies. It contemplates that all members of County Societies shall, on account of their membership in the County Societies, be members of the State Societies. This plan proposed is the one now in operation in states having the best organized profession.

Dr. Jackson's motion was then put to a vote and adopted.

Dr. Jayne: Would it not be well to defer the appointment of delegates?

Dr. Whitney: I move that the secretary read the membership of the present committee on by-laws. Seconded; carried.

The secretary read the names of the committee.

Dr. Jayne: I move that as Dr. Jackson has been in attendance at the American Medical Association, he be added to the committee on by-laws. Motion seconded; carried.

It was moved and seconded that the courtesies of the society be extended to all visiting physicians. Carried.

The President: The next order of business is the report of the committee on literature, by Dr. Jackson, chairman.

Dr. Jackson submitted the following report:

In carrying out the instructions of the society, your committee had the following notice published in most of the medical journals of America:

"PRIZE ESSAY ON THE DANGERS FROM QUACKERY.

"The Colorado State Medical Society offers a prize of twenty-five dollars for the best essay, if deemed worthy of the prize, pointing out the dangers to public health and morals, especially to young persons, from quackery as promulgated by public advertisements.

"The competition is open to all. Essays must be type-

written in the English language, and submitted before May 15th, 1901. Each essay must be designated by a motto; and accompanied by a sealed envelope, bearing the same motto, and enclosing the name and address of the author. The essay receiving the prize will become the property of the society for publication. Others will be returned on application. Essays should be sent to the Literature Committee, Room 315 McPhee Building, Denver, Colorado."

In response to this notice, sixteen essays were received by the date mentioned, and one subsequently. They came from points as widely separated as Rhode Island and San Francisco, Canada and New Orleans. After careful examination, your committee decided to award the prize to an essay bearing the motto, "He whose flight avoids the fray, may still secure the larger pay," which essay is herewith submitted.

Your committee recommends that a similar prize be offered for the ensuing year for an essay upon "The Dangers of Self-Drugging with Proprietary Medicines." Probably a limit should be placed on the length of such essays and attention called to the necessity of confining them strictly to the subject assigned.

EDWARD JACKSON, Chairman,
RUSSELL B. FREEMAN,
C. D. SPIVAK,
E. W. STEVENS,
Committee.

This was accepted and placed on file.

Dr. Jayne moved that the prize essay be referred to the committee on publication. Seconded; carried.

In accordance with the wish of the society the name of the author of the prize essay was made public.

Dr. Jackson: The author is Dr. Will B. Davis of Pueblo.

In response to applause and calls from the floor Dr. Davis said:

Mr. President and Members of the Society—I am very much elated at my success in keeping this prize in Colorado against so many outside competitors, and especially so that it comes to my home town, Pueblo.

It was resolved that a similar prize be offered next year by the committee on literature.

Regarding the disposition of the paper, the committee on literature made no recommendation at this time.

Dr. Jayne: I move that this paper belongs to the society and that Dr. Davis be allowed to publish it wherever he wishes. Seconded; carried.

The next order of business on the program was the general report of the committee on tuberculosis in Colorado by Dr. Henry Sewall, chairman of the committee.

General report of the committee on tuberculosis in Colorado is as follows:

Preliminary report of the committee "To consider the prevalence of tuberculosis in Colorado, and the various problems connected therewith:"

At the meeting of the Colorado State Medical Society held in June, 1900, the incoming president, Dr. W. P. Munn, appointed a special committee "To consider the prevalence of tuberculosis in Colorado, and the various problems connected therewith."

It was understood that the work of this committee should be mainly an inquiry into the question as to whether tuberculosis is indigenous to Colorado, an inquiry which, if affirmatively answered, inevitably leads to two other lines of thought, namely: First, On what conditions does tuberculosis originating in Colorado depend? Second, How may the disease be so controlled as to prevent its further spread in this community? The present committee will resign to its successor the consideration of prophylaxis, that problem of supreme interest which is now engaging the energies of medical thinkers throughout the world, and will limit itself to the employment of means for establishing the facts which may serve as a basis for reasoning and advice.

Already in 1895 the committee on sanitation and preventive medicine of this society chose for the subject of its report "Consumption contracted in Colorado," and the formal announcement was made that "the facts show that consumption contracted in Colorado, and particularly in the city of Denver,

already forms a very important factor in the death roll." At that time the medical profession of the state had not been particularly interested in this question, and the only important records of vital statistics available were those deposited in the Denver health office. At the present time the admirable efficiency of the department of vital statistics of the State Board of Health places at our disposal probably complete and accurate returns of the data of mortality throughout Colorado.

In the appointment of the committee on tuberculosis it was held in mind that the results of its investigations might have widespread influence on the lay community and provoke antagonisms through misapprehension of its objects. It was therefore endeavored to represent in the personnel of the committee the medical profession of Colorado.

Nothing is clearer in the history of demography than the fact that localities, if not climates, which were at one time favorable to the recovery of the consumptive patient, later lose this beneficient power and even become hotbeds of the disease through cases contracting it on the spot. That is, consumption, though at first exotic, later becomes indigenous. No argument will here be advanced to account for this fact, but your committee accepts the current hygienic doctrines that the favorable influence of any region, other things being equal, varies inversely as the density of its population; and that the direct and necessary causal factor in tuberculous disease is the implantation and development of the tubercle bacillus.

The section of this committee to which was relegated the topics "Bacteriology, Climatology and Hygiene," reports:

"Numerous experiments on animals by members of this committee have shown that animals may be as readily inoculated with the tubercle bacillus at this altitude as at a lower one. The tubercle bacillus has been cultivated with the same ease at this altitude as at sea level, the only difference being that extra precautions had to be taken to guard against the evaporation of the media. Experiments by members of this committee have shown that climatic changes have no greater effect on the tubercle bacillus here than at sea level. Mignaco gives the length of

time in which exposure to sunlight kills the tubercle bacillus in sputum at sea level in Italy as twenty-four to thirty hours. It requires thirty-five hours exposure to sunlight in Denver to accomplish this."*

In connection with the report to this society in 1895, already referred to, a member of the committee then maintained that "However beneficial a given climate may prove to cases of consumption immigrating thereto, it does not absolutely, if sensibly, deter the inoculation of susceptible individuals with the disease."

For many years Colorado has been an open-air sanitarium for the consumptives of the world. As time goes on the number, probably both relative and absolute, of children born here with tuberculous antecedents progressively increases, and with it the extent of the soil favorable to the development of the tubercle bacillus. Colorado must, if possible, be saved to the world for a health resort. Visitors to and residents of this state must be protected from the dangers of tubercular infection. This is the final problem to which your committee will apply itself. Your committee fully realizes that its conclusions may, on the one hand, provoke the animosity of short-sighted commercial interests at home and, on the other, excite a needless fear of contagion in unthinking people who would enter the state from abroad.

The present committee has limited itself to the work of ascertaining, as far as possible, the extent to which tuberculosis contracted in Colorado exists. The design of the committee has been not to collect a great number of figures, but to sift the data obtained free from all chance of inaccuracy as to their meaning. Some criticism has already been made of the use of the words employed in designating this research, it being held that vital statistics do not show that consumption is truly *contracted* in Colorado, but only that it may be *developed* here. If this distinction had any value the cases pertinent to this inquiry would be limited to those persons born in the state and who have de-

*Mitchell and Crouch, The Influence of Sunlight on Tuberculous Sputum in Denver.—*Journal of Pathology and Bacteriology,* May, 1899.

veloped tuberculosis without leaving its borders. While such instances are by no means wanting, it is the opinion of the committee that the important factor to consider is the *development* of the disease in an apparently healthy person. When a person has come to Colorado in apparently sound condition and has remained here months or years before manifesting the signs or symptoms of tuberculosis, it is presumed by the committee that the disease has been both contracted and developed here.

For convenience in carrying out its objects, the committee resolved itself into five sections, to which were allotted, respectively, the subjects: 1, mortality statistics; 2, physicians' reports; 3, current literature; 4, correspondence; 5, bacteriology, climatology and hygiene.

The investigation has been carried on in two directions. First, an effort has been made to ascertain the approximate number of cases of tuberculosis now living in Colorado. Second, through an analysis of the death certificates returned to the State Board of Health, to discover the prominence of indigenous tuberculosis as a factor in the general mortality.

In order to achieve the first purpose blanks for the report of cases were distributed among physicians of Colorado, to each of whom was also addressed the following circular letter:

"Dear Doctor—At the last meeting of the State Medical Society a standing committee was appointed 'To consider the prevalence of tuberculosis in Colorado, and the various problems connected therewith.' It is the purpose of the committee to collect such information as may lead to a better knowledge of tuberculosis in this community, and furnish a basis for public instruction through which its spread may be controlled. It is most important to know whether, and to what extent, tuberculosis is contracted or developed in Colorado, whether the number of cases so occurring is on the increase, under what conditions they appear to originate, etc. In the pursuit of this inquiry plain and accurately ascertained facts, not opinions, are desired. You are requested to give to the committee the facts from your experience on the accompanying blank. In the report of the committee full credit will be given for the information you may impart."

The blanks were ruled in columns headed with questions designed to elicit points of information pertinent to this inquiry, as follows:

"Facts regarding tuberculosis developed in Colorado: No.; name of patient; sex; age; nationality or race; occupation; place of birth; residence before coming to Colorado; date of arrival; state of health on arrival; did patient come for health; date of first tubercular symptoms; residence for six months preceding symptoms; family history; was patient temperate in drink, food, exercise; did patient mingle with consumptives; did patient live in well ventilated rooms; did patient take plenty of good food; results of the disease, improved, failed, died (date); diagnosis of disease was made by symptoms, physical signs, sputum examination, autopsy; when was patient last seen by you."

The returns made to these inquiries are not so meager when it is considered that the answers presuppose the most systematic and detailed case-taking on the part of physicians and involve no little labor in their analysis and transcription. It is well known to the committee that certain practitioners whose case books could throw much light on the problem have made no report at all.

In order that there should be no possibility of cases being duplicated in the records of those still living and in the list of death certificates returned to the State Board of Health, the time during which these statistical data apply has been limited to the period included between January 1, 1900, and May 1, 1901, an interval of sixteen months. This limitation necessitated the elimination of the majority of the reports on cases of indigenous consumption still living and under medical observation.

Thus restricted, returns were received from the following twenty-five physicians: W. N. Beggs, S. G. Bonney, F. E. Waxham, H. B. Whitney, W. H. Bergtold, S. D. Van Meter, L. B. Brasher, J. N. Hall, C. B. Van Zant, F. H. S. Ames, W. P. Munn and E. P. Hershey, all of Denver; A. J. Robinson, Aspen; W. F. Martin, J. A. Hart and J. B. Wright, of Colorado Springs; W. McConnell, Monument; L. M. Giffin, Boulder; B. B.

Creighton and H. M. Ogilbee, Manitou; R. Macalister, Glenwood Springs; E. K. Macomber, Delta; J. T. Melvin, Saguache; N. Dymenberg, Rifle; W. R. Kidwell, Pueblo.

The total number of cases reported by them was 113. Eliminating cases known to have died or not seen by the reporters since January 1, 1900, there remain 38 cases, including 21 males and 17 females. Five of the victims were born in Colorado. The youngest was 3 and the oldest 52 years of age; the average age was about 26¾ years. None came to the state on account of health, which in every case was "good" or "perfect" on arrival. The shortest period of residence in Colorado before the development of symptoms of tuberculosis was under one year (two cases); the longest period was 36 years and the average length of residence before the disease appeared was somewhat more than 10½ years. For six months preceding the appearance of tubercular symptoms the place of residence had been fairly well distributed over the state, although 12 of the 38 cases had resided in Denver, and at least 3 of the cases had resided at altitudes of over 10,000 feet. As to family history, it is recorded that in 20 cases there were no known tubercular antecedents. In only 15 cases had there been close association with persons having tuberculosis. As to the results of the disease, 19 are reported as being improved and 14 as having failed. The disease was diagnosticated by means of symptoms and physical signs in all cases and the diagnosis was confirmed by sputum examination in 18 out of the 38.

While a complete enumeration of the living subjects of tuberculosis is, especially from the point of view of prophylaxis, most important to the solution of the problems in which this committe is engaged, the development of the statistical branch of public health service is not yet equal to the supply of such data. On the other hand, the mortality returns made to the Colorado State Board of Health are, it is believed, sufficiently full and accurate to give a true notion not only of the general mortality rate of the state but of the specific history of those dying from tuberculosis.

The work of the present secretary of the State Board of

Health in establishing and carrying into effect so complete a system for the registration of vital statistics is beyond all praise.

The State Board of Health has supplied for the consideration of the committee the mortality returns included within the dates, January 1, 1900, to May 1, 1901. The death certificates used by this board demand on the part of the attending physician not only a naming of the mortal disease but the place where it was contracted.

All the certificates, received within the mentioned period, in which "consumption contracted in Colorado" was given as a cause of death, were subjected by this committee to the following scrutiny: For the period embraced between January 1, 1900, and October 1, 1900, there was forwarded to the physician signing the death certificate, a printed card calling his attention to the case and requesting answers to the list of questions already detailed in a preceding paragraph. Seventy-six complete sets of answers were returned for the period mentioned. Regarding all the reports of deaths from tuberculosis contracted in Colorado occurring between January 1, 1900, and May 1, 1901, concerning which the details had not been reported on the card of inquiry, there was mailed in each case to the attending physician a return postal card asking whether he still maintained the opinion that the tubercular disease had been contracted in Colorado.

The detailed analysis of the data so accumulated will be given in the special report of the sub-committee on mortality statistics.

It may be said in brief that for the sixteen months during which statistics have been collected there were reported to the State Board of Health 1,674 deaths from tuberculosis. In 970 cases it was specifically stated that the disease originated outside the state. In 480 cases the place of origin was not mentioned, while on 224 certificates, or 13.32 per cent. of the whole, it was declared that the disease was contracted in Colorado. The total number of deaths from all causes for the same period is not yet available. But for the first eleven months of the past year the total number of deaths, as announced by the State Board of Health, was 7,014. This would make the general mortality,

based on the United States census for 1900, as 14.18 per thousand per annum and is probably correct. For the eleven months mentioned the total number of deaths from consumption in Colorado was 1,074, and the number of deaths certified to as due to consumption contracted in Colorado was 145, or about 2.7 per cent. of the total mortality, and about 3 persons per 10,000 population per annum. In the special report of the sub-committee on mortality statistics the attention of the student is especially directed to two classes of cases, namely, those of tubercular infantile mortality, usually meningeal in nature, which, it is true, need verification by post-mortem examination, and that interesting class of cases developing among miners at high altitudes in which the pathological condition is tubercular infection associated with marked fibrosis.

Finally, this committee feels justified in drawing from the data presented in its report the following conclusions:

1. Deaths from tuberculosis contracted and developed in Colorado form at present about 13 per cent. of the whole number of deaths from tuberculosis and about 2 per cent. of the general mortality. The disease may therefore be said to be indigenous to the state.

2. The disease, when developed here, is probably less yielding to remedial measures than when imported.

3. Though the larger centers of population show the greater number of indigenous cases, no part of the state is exempt from the actual or potential development of the disease.

4. In the opinion of the committee, consumption was not formerly indigenous in Colorado, but has become so through infection from imported cases.

5. The committee would urge that plans to prevent the further spread of this disease, based on the bacillary theory of its origin, be devised and put in execution at the earliest possible moment.

The foregoing report is signed without reservation by the following members of the committee: Henry Sewall, G. E. Tyler, W. C. Mitchell, Charles Denison, W. P. Munn, W. H. Bergtold, F. E. Waxham, all of Denver. Also by R. W. Corwin,

Pueblo; Frank Finney, La Junta; W. T .Little, Canon City; W. A. Kickland, Fort Collins; H. R. Bull, of Grand Junction.

C. B. Van Zant, of Denver, withholds indorsement of the first part of Section 4 of the conclusions. S. G. Bonney, Denver, and S. E. Solly, Colorado Springs, are not prepared to indorse the conclusions on their incomplete examination of the evidence presented.

Dr. Tyler submitted the following report of the sub-committee on mortality statistics of tuberculosis in Colorado:

The work of this sub-committee has consisted of sorting and classifying the death certificates on file in the office of the State Board of Health from January 1, 1900, the date the State Board of Health began to require the return of death certificates, to April 30, 1901, a period of sixteen months. Whenever a death certificate was found showing tuberculosis contracted in Colorado, a return postal card was sent to the physician signing the certificate, asking whether he still believed the disease had its origin as stated. If he replied that he did not or that he was in doubt, the disease was considered as contracted elsewhere, so that the results given represent only those cases in which the physician in attendance continued firmly of the opinion that the disease originated in this state. For the cases during the first nine months of 1900 specified as contracted in Colorado, a special card was sent to the attending physician requesting information as to history, environment, etc.

Table No. 1 gives the results of the classification of the tuberculosis deaths for the sixteen months covered by the inquiry.

Tables Nos. 2 to 8, inclusive, classify the Colorado cases.

Table No. 9 classifies the 76 concerning which special report was made, these 76 being a part of the 224 in the previous tables.

TABLE NO. 1.

TOTAL DEATHS FROM TUBERCULOSIS IN COLORADO WITH REFERENCE TO PLACE CONTRACTED.*

Month.	*Contracted in Colo.*	*Elsewhere.*	*Not Stated.*	*Total.*
January, 1900	14	62	33	109
February, 1900	13	56	17	86
March, 1900	14	63	23	100
April, 1900	14	63	33	110
May, 1900	15	39	32	86
June, 1900	11	52	29	92
July, 1900	14	56	24	94
August, 1900	12	49	28	89
September, 1900	13	53	28	94
October, 1900	8	68	28	104
November, 1900	17	72	21	110
December, 1900	19	76	42	137
Total for 1900	164	709	338	1,211
January, 1901	29	96	47	172
February, 1901	9	56	36	101
March, 1901	5	60	26	91
April, 1901	17	49	33	99
Total Jan. 1 to Apr. 30, '01	60	261	142	463
Total for 16 months	224	970	480	1,674

* The difference in figures shown by these tables and those shown in the mortality statistics of the fifth report of the Colorado State Board of Health is due to the fact that a number of death certificates were filed with the State Board of Health after the fifth report was sent to the printer.

TABLE NO. 2.

DEATHS FROM TUBERCULOSIS SPECIFIED AS CONTRACTED IN COLORADO, ACCORDING TO SEX.

	1900.	*(First 4 months) 1901.*	*Total.*
Males	100	37	137
Females	64	23	87
Totals	164	60	224

TABLE NO. 3.

CLASSIFIED ACCORDING TO RACE.

	1900.	(First 4 months) 1901.	Total.
White	137	51	188
Black	12	3	15
Indian	1	...	1
Chinese	1	...	1
Mexican	13	6	19
Totals	164	60	224

TABLE NO. 4.

CLASSIFIED ACCORDING TO CONJUGAL CONDITION.

	1900.	(First 4 months) 1901.	Total.
Married	81	36	117
Single	67	21	88
Widowed	13	2	15
Divorced	3	...	3
Unknown	...	1	1
Totals	164	60	224

TABLE NO. 5.

CLASSIFIED ACCORDING TO AGE.

	1900.	(First 4 months) 1901.	Total.
Under 1 year	12	4	16
1 to 2	7	3	10
2 to 5	7	3	10
5 to 10	2	...	2
10 to 20	14	2	16
20 to 30	30	9	39
30 to 40	31	6	37
40 to 50	29	12	41
50 to 60	25	14	39
60 to 70	5	5	10
70 to 80	2	2	4
Totals	164	60	224

TABLE NO. 6.

CLASSIFIED ACCORDING TO PLACE OF DEATH.

County.	*1900.*	*(First 4 months) 1901.*	*Total.*
Arapahoe	65	22	87
Bent	...	1	1
Boulder	5	2	7
Chaffee	1	...	1
Clear Creek	4	4	8
Conejos	1	...	1
Custer	...	1	1
Douglas	1	...	1
El Paso	4	2	6
Fremont	10	...	10
Gilpin	12	5	17
Gunnison	2	...	2
Huerfano	1	...	1
Jefferson	2	2	4
Kit Carson	...	1	1
Lake	3	...	3
La Plata	...	1	1
Las Animas	12	5	17
Mesa	3	1	4
Montrose	2	...	2
Morgan	1	1	2
Otero	3	2	5
Ouray	2	2	4
Phillips	1	...	1
Pitkin	1	1	2
Prowers	2	...	2
Pueblo	13	4	17
Rio Grande	1	2	3
Saguache	4	...	4
Teller	3	1	4
Weld	5	...	5
Totals	164	60	224

TABLE NO. 7.

CLASSIFIED ACCORDING TO OCCUPATION.*

	1900.	(First 4 months) 1901.	Total.
Blacksmith	2	...	2
Book Binder	1	...	1
Butcher	1	...	1
Carpet Renovator	...	1	1
Clerk	3	...	3
Cook	...	1	1
Dressmaker	...	1	1
Engineer	2	...	2
Farmer	12	3	15
Foreman	1	...	1
Fruit Dealer	1	...	1
Hotel Keeper	1	...	1
Housewife and Housework	31	14	45
Laborer	8	1	9
Lawyer	...	1	1
Machinist	2	...	2
Mechanic	2	...	2
Merchant	1	...	1
Millman	2	...	2
Miner	34	15	49
Musician	1	1	2
Packer	1	...	1
Plasterer	1	...	1
Porter	1	...	1
Printer	3	...	3
Railroader	1	...	1
Real Estate	1	1	2
Salesman	...	1	1
Sheepherder	...	1	1
Sporting Woman	...	1	1
Stone Worker	...	2	2
Student	4	...	4
Teacher	1	1	2
Watchmaker	1	...	1
Without occupation	45	14	59
Totals	164	60	224

*The occupations here given refer to the occupation *at time of death*, and not when the disease was contracted.

TABLE NO. 8.

CLASSIFIED ACCORDING TO VARIETY OF DISEASE.

	1900.	(First 4 months) 1901.	Total.
Tuberculosis of Lungs..	83	18	101
Tuberculosis of Meninges*	19	8	27
Tuberculosis of Peritoneum*	1	1	2
Tuberculosis of Intestines	4	1	5
Tuberculosis of Genito-Urinary System	1		1
Tuberculosis of Glands..	2		2
Tuberculosis of Larynx.	1		1
Tuberculosis, general....	2	3	5
Tuberculosis without qualifying adjective.	36	15	51
Miners' Consumption ...	15	14	29
Totals	164	60	224

*The committee realizes that a reasonable doubt may be entertained as to the diagnosis of tuberculosis of the meninges and tuberculosis of the peritoneum unless verified by autopsy.

TABLE NO. 9.

Of the 76 contracted in Colorado, concerning which special report was made, 16 were born in Colorado and 60 elsewhere.

Of the 16 born in Colorado, 3 died of pulmonary tuberculosis, 5 died of tuberculosis without qualifying adjective, 6 died of tubercular meningitis, 2 died of intestinal tuberculosis.

Of the 16 born in Colorado, 6 died under the age of 1 year, 3 died from 1 to 2 years, 2 from 2 to 5 years, 3 from 10 to 20, and 2 from 20 to 30.

Of these 16, 12 were never outside of Colorado, 3 were, and as to one the doctor did not know.

Of the 60 born outside Colorado, 3 lived in Colorado less than one year before development of first tubercular symptoms, 4 developed symptoms between the end of the first and the beginning of the second year, 5 between the second and fifth years, 6 between the fifth and sixth years, 21 between the tenth and

twentieth years, 4 between the twentieth and thirtieth years, 1 between the thirtieth and fortieth years; and as to 16 the length of residence prior to development of symptoms was unknown.

In 20 of the 76 cases the diagnosis was confirmed by microscope.

Of the 60 born elsewhere, 7 were in extremely good health on arrival, 39 were in good health, 6 were in fair health, 1 was in average health, 1 had cholera but was otherwise well, and in 22 cases no statement was obtained on this point.

Sixteen were intimately associated with consumptives, 50 were not, and as to the remaining 10 no statement was made.

Thirty-eight lived in well ventilated, healthful rooms, 30 did not, and no statement was made in 8 cases.

Forty-three had no tubercular family history, in 11 the mother was tubercular, in 3 the father, in 1 both parents, in 4 a brother and in 1 a sister. No statement was made in the remaining 13 cases.

There were 16 children under 5; 10 of them were breast fed. During the nursing period the mother's health was good in 5 cases, not good in 4 cases and not stated in 1.

Four were not breast fed. Of these 1 was given condensed milk, 1 was given cow's milk and 2 had prepared foods.

G. E. TYLER, Chairman.

In the absence of Dr. Mitchell the report of the sub-committee on bacteriology, climatology and hygiene of tuberculosis in Colorado was not read, but is presented herewith:

Bacteriology. This committee takes the dictum formulated by Koch in 1882 that the tubercle bacillus is not only a cause of tuberculosis, but the only cause of the same, and that without the tubercle bacillus tuberculosis does not exist, as the foundation on which are based all problems pertaining to the etiology of tuberculosis. Nevertheless the character of the already prepared soil for the reception and proliferation of the specific bacillus must be considered as a very important factor in the inception of the disease, for it is only by a study and correction

of this soil hygienically and by guarding it against the invasion of the bacillus that the best results will be obtained.

Numerous experiments on animals by members of the committee have shown that animals may be as readily inoculated with the tubercle bacillus at this altitude as at a lower one.

The tubercle bacillus has been cultivated artificially with the same ease at this altitude as at sea level, the only difference being that extra precautions had to be taken to guard against the evaporation of the media.

Experiments by members of this committee have shown that the climatic changes have no greater effect on the tubercle bacillus here than at sea level. Mignaceo gives the length of time at which exposure to sunlight kills the tubercle bacillus in sputum at sea level in Italy from twenty-four to thirty hours. It requires thirty-five hours exposure to sunlight in Denver to accomplish this.

Sunshine aids in destroying the tubercle bacillus, not by virtue of any climatological difference which may occur at this altitude, but by the greater number of hours of sunshine which we have.

Tubercle bacilli kept in a dark and moist condition have proven virulent after at least two years. In so far as the germicidal effect of this altitude and climate on the tubercle bacillus in both culture and sputum is concerned, we do not believe it to be any more effectual (with the exceptions noted above) on this micro-organism than are the climatological conditions at sea level.

Climatology. The climate of Colorado is complex, not only in its varieties but also in its effects on the human economy. The word climate, as used in the present paragraphs, means that variety found in Colorado below 6,500 feet altitude, where the average yearly rainfall is fifteen inches or less, and where the percentage of possible yearly sunshine is sixty-five or more; any place along the eastern foothills and plains can be taken as an example.

This limitation is desirable, for by it we exclude the climate of locations situated so high in altitude as to bring the precipita-

tion near to twenty inches, and to lessen the sunshine correspondingly. No fairly complete work has ever been done in investigating the physiology of people living a mile above sea level the year round; much work has been done along these lines with persons sojourning for a few months at such an altitude, some observations being much at variance with others; in fact, we have not much definite scientifically gathered evidence showing how our physiology differs from that at sea level.

There is, of course, no question as to the value of sunshine on the individual's well being; hence in Colorado, with its high average of sunshine, this fact is one of importance and plays a prominent role in betterment of health.

The low daily humidity at this altitude increases evaporation from the lungs and skin, and greater loss of heat thereby. It also causes a wider difference between actual and sensible temperatures than found at lower altitudes, and makes a Colorado locality cooler in summer than any place corresponding to the same latitude at sea level.

Thus Denver, at nearly the same latitude, has a cool and pleasant summer climate, when one can always use a blanket at night, while in Washington man's efforts are converged on being thinly clad and keeping cool.

The common idea that Colorado is more subject to winds is not borne out by the weather bureau statistics of various eastern places, as compared with other locations. Thus Denver (Colorado Springs slightly more) has about 6,048 miles of wind a month, while New York City has 9,936*. The appearance of more wind in Colorado is probably due to the fact that while in New York City a large part of the average monthly wind mileage may be accumulated by a couple of short storms, Colorado winds blow more steadily and regularly and at a lower speed. Another factor in maintaining this error is that newcomers notice the wind more because it soon disturbs the circulatory evaporation, and excretory

*For the first fifteen years of observation of United States Weather Bureau Denver's average was 4,580 miles per month.—Western Bureau Statistics of 1899.

balance between the skin, lungs and kidneys normal at lower levels, the dry winds abstracting moisture from the skin and lungs with greater rapidity until readjustment to these conditions occurs, while the increased evaporation determines increased heat loss, introducing another factor disturbing the previous sea level physiology.

The effects on the human economy of the lowered barometric pressure obtaining in high altitudes are still much in dispute. It *seems* well established, however, that there is often at least a temporary, even though slight, cardiac dilatation, perhaps hypertrophy, and that there is increased pulmonary ventilation, and accelerated heart rate.

An immediate effect on the circulation on coming to this altitude is to cause increased blood flow to the pulmonary and cutaneous vessels; because of this fact a person with any obstruction in the cardiac circulation tending to dam blood back into the lungs should engage on a journey or residence in Colorado with caution. Moreover, if the heart lesion be very marked it prohibits a residence here, under penalty of serious heart and lung disturbances.

While there yet remains observers who believe that high altitudes do not increase the hemaglobin and red cells of persons living in such localities, it *seems* well established to your committee that there is an increase of these blood constituents on living in a high altitude for more than a few days, and that this increase is real, not apparent. There is great need of a full and definite knowledge of the physiology of organisms living in high altitudes.

Hygiene. The consideration of the hygiene of the tuberculous in Colorado is here limited to those features which are varied or which differ at this altitude from what obtains at sea level. This subject is naturally subdivided into the hygiene of: (1) clothing, (2) food, (3) exercise, (4) ventilation, and (5) method of living or occupation.

Your committee would summarize as follows: 1st. As to clothing and the care of the skin: There is even more need in Colorado than in the lowlands of protecting the surface of

the body by woolen undergarments, chosen as to weight or thickness to suit the season of the year, because in the higher and so colder and dryer country, the quick evaporation or perspiration, making it insensible much of the time, may too suddenly deprive the body of its latent heat.

The daily friction of the surface of the body after a cold sponge or plunge is of special advantage in giving a healthy skin as well as in increasing the resistance of the body to catching cold.

2nd. There are only slight changes to be recommended in Colorado in the generous diet needed by all tuberculous persons. These are suggested by the enhanced apetite and ability to digest carbonaceous and nitrogeneous foods due to the colder climate and to the stimulation of the bodily functions, favoring the assimilation of much needed tissue building and heat producing elements of food as well as the elimination of effete results of bodily waste.

3rd. The value of exercise in the prevention and cure of tuberculosis is only the more impressed upon the minds of clinicians by the study of high altitude effects upon the tuberculous; only, the exercise, as to amount and severity, must be graduated to the physical condition and nervous peculiarities of the individual under consideration.

The heart action and the temperature are the chief guides, so all advanced cases should be constantly under the guidance of the attending physician as to exercise. The change itself to a high altitude is exercise enough for some invalids, especially with any weakness of heart, or during the breaking down of lung tissue, till acclimatation is accomplished. Daily, systematic progression in exercise, up to the highest health standard obtainable, is what needs to be taught; individualization on the part of the teacher or physician being a necessary requirement.

4th. Ventilation is an important hygienic feature of the subject under investigation. Its consideration in conjunction with that of the life of the tuberculous in Colorado leads up to the conclusion that the good effects of outdoor life and the bad effects of deficient ventilation are both increased by any considerable elevation.

5th. The method of living or occupation of the tuberculous in Colorado seems to hinge upon the conclusion already reached that as outdoor life is the key-note of the *cure,* so is deficient ventilation one of the main predisposing causes of tuberculosis. (An analysis of the conditions under which four certain cases have developed tuberculosis in this state, shows that deficient ventilation was a contributory or presumable predisposing cause in all of them.)

Though young men and young women, coming here from the eastern states who have tuberculosis, have been known to keep the same in arrest while clerking in stores under unhygienic conditions, yet the curative value of a life principally out in the open is by contrast so much greater as to make it essential that all tuberculous persons should reside and work in the country if possible. The bane of the great majority of these persons is their poverty, therefore charitable and legislative aid needs to be invoked that they may enjoy the blessings of a complete change of living from confinement in unventilated quarters to the natural life in the open air.

In conclusion, the prevention of tuberculosis, and the improvement of the condition of the tuberculous in Colorado through hygienic means, necessitates a thorough education of the people upon the measures here considered, as well as the destruction of the germs. It also necessitates the enactment of such legislation as will fully meet the question of deficient ventilation that this potent factor in the causation of tuberculosis may, in a measure, be abolished.

W. H. BERGTOLD,
WM. C. MITCHELL, Chairman.
CHARLES DENISON.

The President: What shall be done with the report of the committee on tuberculosis in Colorado?

It was moved and seconded that this committee be continued unchanged in personnel another year and that the report be received and placed on file.

Dr. Sewall: The report is not yet finished.

Dr. Tyler: Mr. President, I have not had time to see the other members of the sub-committee, so that this report is only signed by the chairman.

The President: The motion is now in order that the report of the committee on tuberculosis in Colorado, when finished, shall be received and published in the printed transactions, and that the committee be continued unchanged in personnel during the next year. Seconded; carried.

DISCUSSION ON THE REPORT OF COMMITTEE ON TUBERCULOSIS IN COLORADO.

Dr. Van Zant: Mr. President and Members of the Society—As a member of the committee, I am sorry that I was not able to be present at the meeting last night, at which the report was formulated; for I find myself somewhat at variance with some of its conclusions. As I had not the opportunity then, the committee will not consider it discourteous, I am sure, if I express my views to-day, in this discussion on its report.

To begin with, the cases presented in this report are confined to one year's statistics, and are not nearly numerous enough, in my judgment, to form a safe basis for any certain conclusions. I feel sufficiently conservative in this matter to express the belief that we ought to be exceedingly careful as a society before sending broadcast over the country conclusions based on a limited number of cases, and hence, of doubtful value. It is stated in the report that tuberculosis was formerly not indigenous, and that during the last year indigenous cases constituted 13 per cent. of the deaths. In this question of the rapid increase in the percentage of cases originating here, we ought to be cautious, for in such an estimation, there are two terms in the ratio,—the number of cases coming from the East and dying here and the number of indigenous cases dying in Colorado. It is not necessary that the number of cases contracted here shall increase to heighten the ratio, but simply that fewer cases from elsewhere come here to die, than in preceding years. Then again, it is sometimes hard to tell whether a case is contracted here or not. I lost a case a few weeks ago, which I considered to be a tubercu-

losis of the meninges, and returned it on the death certificate as such, and as originating here. The child had been here a year, had a tuberculous mother, and had been gradually failing in health for months before the fatal seizure. Though reported and included in statistics as an autochonous case, I think it very likely that in this case there was an old tuberculous focus somewhere, probably in the bronchial glands. Such facts ought to make us careful in drawing conclusions from statistics, especially when of a limited scope.

While the committee is on the right track, I do not feel, as yet, or from the facts presented, that we are justified in sending out a loud note of alarm through the country, regarding a rapid increase of tuberculosis in our state. We may hastily place ourselves in a position from which we will have to recede. I feel the need of caution the more, because of the sarcastic way in which our alarm is being treated in the East. For instance, J. C. Wilson, of Philadelphia, than whom we have no higher authority, indulges in language something like this on this very question: "The recent peculiar state of mind in many of the western health resorts, regarding the spread of tuberculosis, calls to mind the epidemics of chorea during the middle ages."

My position is simply that of the conservative thinker, unconvinced as to those conclusions of the report showing a rapid increase of the indigenous cases, but willing to be convinced by a more elaborate study running through a large series of years. With the rest of the committee I believe that the most stringent measures should be taken to prevent cases from originating in this state, as they undoubtedly do, in limited numbers.

Dr. H. B. Whitney: I sympathize very strongly with the position taken by Dr. Van Zant. It is stated in the report that tuberculosis is now indigenous in Colorado, whereas it formerly was not. This means but little. Of course tuberculosis became indigenous here with the advent of the first consumptive, and would anywhere else. The great question is as to its relative frequency—whether the frequency with which tuberculosis is contracted in Colorado is greater now relative to the population

than it was in earlier years. The report of our committtee would tend to give the impression that it is more frequent, and this impression already prevails widely throughout the East. I desire to protest against this conception, and to assert that as yet no statistics have been adduced which justify it in the least, and against it is the clinical experience of every one of us. No one who has practiced in the East before coming to Colorado can fail to have noticed the enormous difference in the relative number of cases of incipient phthisis encountered there and here. In any eastern dispensary for example, they are of daily occurrence; in Colorado such a case is so rare as to cause marked comment and attention. These clinical facts, with which I am sure most of us will agree, are worthy of some consideration in deciding the question as to the frequency of tuberculosis in Colorado.

Dr. Tyler: Mr. President, I wish to defend the report of the committee. If those who have criticised the report will look it over carefully they will see that there are no startling conclusions announced. As stated in the report of the sub-committee on mortality statistics, every case there detailed as having originated in Colorado was made the subject of special investigation and no cases were included in the 224 reported where the attending physician was ever in doubt as to its origin. The records and the results of the investigation are matters of record in the office of the State Board of Health and can be verified by any one having sufficient interest to look them over. There are, however, two things which the committee had in mind and which are in a foot-note. The committee recognizes that in cases reported of tuberculosis of the peritoneum and of the meninges a reasonable doubt may exist as to the accuracy of diagnosis unless a post-mortem is held; hence these two classes have the foot-note mentioned. I agree, however, with the sentiment expressed by Dr. Whitney that the report of the committee should call attention to the fact that as compared with other states, a very small percentage indeed originates at the place of death. Doubtless a careful study of deaths from tuberculosis in eastern states would show at least 90 per cent having originated in the state where the death occurred, while in Colorado less than 14 per cent.

have such origin here. Concerning the criticism of eastern physicians, I do not believe that this should deter us from stating what we believe to be true. The committee was appointed one year ago to ascertain the facts shown as far as possible. It is but fair to the committee to say that it has made an earnest attempt to secure the facts. This report, be it remembered, is not being made through the newspapers nor to the public in general; but it is made to the most representative and scientific body of medical men in the West. There can therefore be no just charge of sensationalism. The fact that some eastern men who possess no accurate knowledge of conditions in Colorado have seen fit from time to time to hold up to ridicule medical men who hold opinions different from their preconceived ideas should have no terrors for the honest investigator in this state.

I have had some experience with men of this sort. Several months ago a leading eastern medical journal made the assertion that Colorado was about to quarantine against consumptives. This information was undoubtedly taken from newspaper reports and no attempt to verify the report was made. I wrote protesting against the publication of such a statement and my protest was put in an out-of-the-way place in the journal. In spite of my protest a Chicago physician wrote an article on the subject of tuberculosis which was given a prominent place in the journal, and in this article he stated that Colorado was seriously considering the question of quarantining against tuberculosis. I submit, therefore, that the report of the committee is just and fair and that there is no reasonable objection to its adoption.

The report was then adopted without opposition.

A motion was made that a vote of thanks be extended to this committee for their arduous and excellent work. Seconded; carried.

A motion was made by Dr. Corwin that Dr. Bull of Grand Junction should be requested to state to the society some facts in his possession concerning the existence of tuberculosis in Colorado among Indian children. Seconded; carried.

Dr. Bull then presented notes upon tuberculosis among the pupils in the U. S. Indian school at Grand Junction.

Dr. Bull: I have made no preparation for this matter, but as physician to the U. S. Indian school at Grand Junction during the past twelve years, I have kept an accurate record of all tuberculosis occurring in that institution since January 1st, 1896. I will say in regard to the pupils of this institution that they come mainly from Arizona, Utah and Nevada; that these pupils come here after having passed a rigid examination by the agency physician and are subsequently re-examined by myself. They come here in perfect health, and are from the ages of five to fifteen years. The causes reported have originated in Colorado absolutely. The family history of these pupils, we have, of course, been unable to determine. I shall give briefly the number of cases that have occurred during this period and will state in regard to those cases that every case except the last one has been verified by microscopical examination.

As far as physical examination could determine they were all in perfect health when they came here. They were from the arid regions of the southwest, from a warmer and even dryer climate. In every instance there was some primary illness which preceded tubercular infection.

Following are the cases which occurred since 1896:

1896.

Case 1. I. W., female, aged 11 years, Apache. Left apex involved; bacilli discovered Feb., 1896, returned to reservation about May, 1896. No report of outcome.

Case 2. M. S., female, Pima, aged 14 years. Bacilli discovered June, 1896. Case complicated with chorea. Returned to reservation. No report of outcome. However, it is fair to presume that these cases have improved or possibly recovered, as we are frequently securing new children from these reservations and would be likely to hear of a fatal outcome.

Case 3. L. G., female, Yuma, aged 12 years. Bacilli first discovered May, 1896. Returned to reservation December 12, 1896, much improved and reports recently from reservation state that she is well.

Case 4. Q. T., female, Mojave, aged 16 years. Following typhoid fever; bacilli discovered November, 1896; returned to reservation December 12; recovery not expected.

1897.

Case 5. R. M., female, Ute, aged 12 years. Bacilli discovered February, 1897; returned to reservation April 13, 1897; report of death on reservation.

Case 6. I. K., female, Apache, aged 14 years. Bacilli discovered March, 1897; death August 20, 1897.

Case 7. F. M., male, aged 20 years, Yuma. Bacilli discovered September, 1897; returned to reservation November 27; much improved. Reported well one year later. Later still, news of sudden death from some acute cause.

1898.

Case 8. I. V., female, Yuma, aged 12 years. Bacilli discovered April; death May 10. This is one of the very acute cases following la grippe.

Case 9. L. V., female, Papago, aged 17 years. Bacilli discovered May, 1897; following la grippe. Right apex involved, several severe hemorrhages; recovered now attending school at Phoenix, Ariz.

1899.

Case 10. G. M., male, 15 years. Bacilli discovered February, 1899, following an attack of la grippe; returned to reservation April 17, 1899; no report since.

Case 11. S. G., male, Navajo, aged 18 years. Bacilli discovered July, 1899; returned to reservation July, 1900, apparently recovered.

1900.

Case 12. J. H., Navajo, male. Began 1898; death April 18, 1900. This case began as tubercular laryngitis.

Case 13. J. S., male, aged 14, Pima. Bacilli discovered May 20, 1900; returned to reservation; still living and reported improved.

Case 14. B. S., female, aged 14 years, Shebet. Bacilli discovered July 10, 1900; death September 14, 1900.

1901.

Case 15. J. C., male, 20 years of age, Pima. Bacilli discovered January 12; reservation April 10; report of death on reservation.

Case 16. S. E., male, aged 20 years, Pima. No bacilli discovered, but every evidence of pulmonary tuberculosis except presence of bacilli; returned to reservation April 10, 1901; reported improved. H. R. BULL.

BOSTON MEDICAL LIBRARY JAN 13 1902

The next order of business was the election of the committee on place of meeting.

The election resulted as follows: Dr. W. B. Davis, Pueblo, chairman; Dr. G. E. Tyler, Denver; Dr. M. Ballin, Leadville; and Dr. B. A. Arbogast, Bedrock.

The election of the committee on nominations was the next order of business.

Dr. Work: I move, Mr. President, that a committee of five be elected by the society as a committee on nominations; that of the five members not more than one shall be from any one county.

Seconded; carried.

It was moved and seconded that the secretary cast the ballot for the following names: Dr. S. D. Hopkins, Denver, chairman; Dr. William Dow, La Junta; Dr. Sol G. Kahn, Leadville; Dr. Hubert Work, Pueblo; Dr. H. R. Bull, Grand Junction. Carried.

The society then adjourned until 2 o'clock.

AFTERNOON SESSION.

The society was called to order at 2:15 by the president.

There being no urgent business to be transacted, the society proceeded with the regular scientific program.

The first paper to be presented was entitled, "Gonorrheal Rheumatism," by Dr. Hobart E. Warren of Denver.

"Mother's Milk" was the subject of a paper read by Dr. E. C. Hill, of Denver.

Dr. W. A. Jayne presented the next paper on the program entitled "Consideration of the Radical Operation for Uterine Carcinoma."

"Dry Heat in the Treatment of Disease" was the title of a paper by Dr. R. W. Corwin, of Pueblo, and discussed by Dr. H. E. Warren, of Denver.

"A Case of Typhoid Fever with Greatly Enlarged Liver" was reported by Dr. Alfred Mann, of Denver.

Dr. S. Simon, of Denver, made a report of cases examined for admission to the National Jewish Hospital for Consumptives.

The President: The society has been greatly privileged in hearing this report of one of the greatest charitable institutions in the state.

"The Late Epidemic of Typhoid Fever in Fort Collins" was not discussed, owing to the absence of the writer, Dr. P. J. McHugh.

Dr. A. S. Lobingier, of Denver, read a paper entitled, "Some Notes on Resection of the Ribs in Empyema," and presented a case. The paper was discussed by Drs. Leonard Freeman, H. B. Whitney, J. N. Hall, Frank Finney and E. K. Macomber. Discussion closed by Dr. Lobingier.

Dr. Eskridge read a communication from one of the executors of the estate of the late Dr. W. F. McClelland, concerning the donation of the medical library of deceased to the Colo-

rado Medical Library Association. The communication was as follows:

"Denver, Colo., June 18, 1901.

"Colorado State Medical Association, Denver, Colorado:

"Gentlemen—Yesterday I received a letter from the heirs of the late Dr. William F. McClelland instructing me to turn over to your association his medical library; and to-day the judge of the County Court has issued an order granting me the power to do so.

It would give me pleasure if you would let me know when and where I may deliver the gift.

This is donated in the name of Dr. W. F. McClelland.

Yours truly,

R. H. MALONE, Executor.

Dr. Eskridge: Soon after the death of our lamented friend I interviewed the executor of the estate and asked him if he would not give the medical library to the Colorado Medical Library Association. He said he would confer with the others connected with the estate and let me know. I received this communication, and I move that we accept this gift and extend to the family our heartiest sympathies in their bereavement. Seconded; carried.

The President appointed Drs. Spivak, Eskridge and Jackson as a committee to represent the society in securing and cataloging the books of the library.

"The Problem of the Age is Life—Development is the Conservation of Energy," was read by Dr. B. A. Arbogast, of Breckenridge.

Dr. A. Zederbaum, of Denver, then presented a paper entitled, "Mental Disturbances in the Course of Cardiac Disease."

Discussion by Dr. J. N. Hall, of Denver.

"The Treatment of Neuralgia by Oleum Ricini," read by Dr. F. E. Waxham, of Denver, was discussed by Drs. Hopkins, of Denver and Espey, of Trinidad. Closed by Dr. Waxham.

Dr. R. F. LeMond, of Denver, submitted a paper on "The Value of Electricity in Eye Work."

Discussion by Drs. Jackson and Stover, of Denver. Closed by Dr. LeMond.

Dr. W. N. Beggs, temporary chairman of the finance committee, then submitted the report of said committee, stating that it had upon examination found the report of the treasurer correct. Moved that this report be accepted. Seconded; carried.

By a motion seconded and carried, the report of the treasurer was accepted and placed on file, to be printed in the Transactions.

Dr. Powers: I would like to ask whether it would be proper at this time to bring up the question of the disposal of the prize essay.

The President: The recommendation of the publication committee was adopted that Dr. Davis could publish that paper wherever he pleases, and the paper was ordered printed in the Transactions.

Dr. Jackson: My impression is that this paper is a proper one to be published in a journal and in the daily papers, and that is probably where it would do the most good. I think that it would be rather inappropriate to do anything else.

It was moved and seconded that the publication committee have a thousand reprints made of the prize essay by Dr. Davis. Carried.

The meeting adjourned.

WEDNESDAY, JUNE 19.

MORNING SESSION.

The meeting was called to order at 9:45 a. m. by the president.

The President: By a resolution adopted yesterday morning, the first order of business will be the report of the committee on by-laws.

Dr. J. M. Blaine, chairman of the committee on by-laws, then submitted the following report:

Mr. President and Members of the Society:

Your committee on by-laws begs leave to submit the following report:

(1) Complete revision of the by-laws to conform with the suggestions of the committee of the American Medical Association is not practicable at the present meeting, owing to the limited time at its disposal.

(2) That the committee on by-laws for the ensuing year include at least one member from each county represented in the society.

(3) That this committee be recommended to prepare revised by-laws providing for general reorganization of county medical societies, making all members of county societies members of the state medical society and raising the funds of this society by per capita assessment on county societies.

J. M. BLAINE, Chairman.

Dr. Jackson: I move that this report be adopted. I would

make a motion that the recommendations may then become instructions for the next committee on by-laws. I would move that the report be adopted *in toto*.

Dr. Whitney: I am sorry that I did not hear the full report. It seems to me a very important matter. It seems to me, moreover, that the matter should be taken up at a fuller meeting.

Dr. Perkins seconded Dr. Jackson's motion.

Dr. Jackson: On looking over the by-laws last night, it became very evident that the majority, perhaps all, of the articles would require some alteration to make them properly correspond with the new constitution of the American Medical Association. These changes are very important. We now have less than 500 regular members of the county societies, and, consequently, were they all members of this society, we would be entitled to but one representative to the house of delegates. If this is the case, the reason for immediate action is removed. Now it is extremely important that we get the profession of Colorado interested in this matter. The thing is to bring about a new stage in the organization of the profession of the state. The difficulty will be to get them interested in the proposed alterations of our by-laws. We probably can get more interest and more discussion if it is acted upon a year hence—after consideration by a committee—than if the matter were finally disposed of at the present time. If this committee contained a member from every county, we should gain the widest possible attention. The most important of the proposed changes is the one making all members of county societies members of the state society.

Dr. Whitney: It seems a very great question if this can be adapted to Colorado conditions. I would very much prefer to see the word "Recommend" in this clause. I would move that "Recommended" be substituted for "Instructed" in Clause III.

Dr. Melvin: I would call the attention of the committee and the society to some conditions in this state which are not exactly paralleled by conditions in other states. If we are going to continue this society as a united representative body of the

whole profession of this state, some allowance will have to be made for those who are in isolated districts.

The President: I may state in connection with Dr. Melvin's remarks that the same question had been taken up and considered at a meeting of the board of trustees of this society. There are fifty-seven counties in this state, thirty-seven of which are represented in our membership, but in only seventeen of these are there county societies in existence.

The question was then put upon the adoption of Dr. Jackson's motion, which was carried.

Dr. Blaine submitted the following:

Amend the last half of Article XII, Section 2, to read: "He shall receive as compensation for the faithful discharge of his duties, the sum of $50.00 per annum. He shall, in conjunction with the chairman of the executive committee, employ a stenographer to assist in recording all papers and discussions and preparing same for committee on publication, said stenographer to be paid from the funds of the society."

J. M. BLAINE, Chairman.

This was offered as an amendment to the report of the committee on by-laws. Amendment as offered was adopted.

There being no further urgent business, the regular scientific program was taken up.

"A Study of the Hemorrhoidal Circulation, with Special Reference to the Prevention of Post-Operative Bleeding in Radical Operations for the Cure of Piles," was presented by Dr. Will B. Davis, of Pueblo.

Dr. P. F. Gildea read a paper entitled, "Tubercular Laryngitis," which was discussed by Drs. Waxham, Levy and Forhan. Dr. Gildea closed the discussion.

The next paper on the program, "Some Observations in Abdominal Surgery, with a Brief Report of Cases Operated

Upon Since January 1, 1899," was read by Dr. I. B. Perkins, of Denver.

"Disinfection After Contagious Diseases" was then presented by Dr. G. E. Tyler, of Denver. Discussion by Drs. Bull and Espey; closed by Dr. Tyler.

Dr. W. A. Kickland made "A Report of One Hundred Cases of Typhoid Fever Seen in Private Practice in the Fall of 1900."

In the absence of Dr. C. B. Lyman, of Denver, "A Series of Interesting Fractures" was read by title.

"Some Experiences in Venesection," by Dr. H. B. Whitney, was discussed by Drs. P. D. Rothwell and Denison; discussion was closed by Dr. Whitney.

Dr. M. Ballin, of Leadville, then presented a paper entitled, "Successful Case of Talma's Operation for Ascites in Cirrhosis of the Liver." Discussion followed by Drs. Craig, Parkhill, Cochems, Ballin and Lobingier.

It was moved, seconded and carried that the session be continued until 12:45.

Dr. U. D. McDowell's paper, "The Present Epidemic of Small-pox," was discussed by Dr. Tyler. Discussion closed by Dr. McDowell.

"A New Method for Measuring the Length of the Oesophagus," with a clinical demonstration, was presented by Dr. C. D. Spivak, of Denver.

Discussion by Dr. C. A. Powers.

Dr. A. H. Williams, of Denver, presented a paper entitled, "Egg Membrane as An Artificial Tendon-Sheath." Discussed by Drs. C. A. Powers, Lobingier and Leonard Freeman.

Dr. Clayton Parkhill invited members of the society to a clinic which he held at St. Luke's Hospital.

"A Case of Extra-Uterine Pregnancy" was reported by Dr. Pfeiffer, who exhibited a specimen illustrative of the case.

The society here took recess until 2 o'clock.

AFTERNOON SESSION.

The meeting was called to order at 2 o'clock by the president.

As there was no urgent business, the regular scientific program, "A Symposium Upon the Diseases of the Kidney," was taken up, and the following papers were read:

PART I.

Dr. C. B. Van Zant—"Physiology of the Kidneys."

Dr. E. C. Hill—"Chemical Examination of Urine."

Dr. W. H. Bergtold—"Microscopical Examination of Urine."

Dr. Edward Jackson—"Ophthalmoscopic Examination."

PART II.

Dr. G. E. Tyler—"Persistent or Cyclic Albuminuria without Clincal Symptoms."

Dr. J. Tracy Melvin—"Remote Phenomena of Kidney Disease."

Dr. H. B. Whitney—"Etiology, Symptomatology and Treatment of Acute Nephritis."

Dr. C. G. Hickey—"Renal Functions and Life Insurance."

Dr. H. T. Pershing—"Nephralgia and the Neuropathic Kidney."

Dr. J. A. Wilder—"Etiology and Pathology of Chronic Nephritis and Amyloid Kidney."

Dr. H. R. Bull—"Symptoms, Diagnosis and Treatment of the Chronic Nephritides."

Dr. S. D. Hopkins—"Uremia and Its Differential Diagnosis."

Dr. J. N. Hall—"Cardio—Vascular Changes of Renal Diseases."

Dr. Frank Finney—"Renal Hæmaturia and Nephrolithiasis."

Dr. R. K. Macalister—"Gouty Affections of the Kidney."

Dr. G. H. Stover—"X-Ray in the Diagnosis of Kidney Disease."

Dr. T. M. Burns—"The Kidney During Pregnancy."

Dr. Hubert Work—"Puerperal Eclampsia."

Discussion of Part II. by Drs. Eskridge, E. C. Hill, W. E. Wilson and T. M. Burns, of Denver, and W. B. Davis of Pueblo.

Dr. Tyler: I received, a few days ago, a communication from Professor Simon Flexner, of Philadelphia, asking that he be allowed to study any groups of cases of dysentery that may occur in the practice of physicians this summer. He is willing to come to Colorado, and if he is unable to come, he will send trained assistants. I wish the profession would bear this in mind, and, if they will notify me, I will notify him.

PART III.

Dr. William Dow read a paper entitled, "Anæsthetics in Renal Disease."

Dr. F. N. Cochems—"Tumors of the Kidney."

Dr. C. K. Fleming—"The Present Status of Nephrorraphy."

Discussion of Part III. by Drs. Parkhill, Miel, Lobingier, Freeman, Rogers, Craig, Cochems, Burns and Grant.

The society adjourned.

On Wednesday evening, a special program was rendered for the members of the society and their friends, at which Dr.

Wm. C. Mitchell made an address on "Bacteriology in Commerce;" Dr. Leonard Freeman on "Surgery in the Twentieth Century." Dr. Corwin's address, "Medicine in Egypt, Past and Present," was presented with stereopticon views. These addresses were interspersed by refreshments, and music by Horst's orchestra.

THURSDAY, JUNE 20.

MORNING SESSION.

The meeting was called to order at 9:30 by the president.

There being no urgent business, the regular scientific program was taken up.

The first paper to be read was entitled, "The Tonsils," by Dr. Robert Levy, of Denver. Discussion by Drs. Gildea and Waxham. Closed by Dr. Levy.

"Typhoid Fever, with An Analysis of Cases," was the title of a paper read by Dr. W. T. Little. Discussion by Drs. W. E. Wilson, Miel and Munn. Closed by Dr. Little.

Dr. C. A. Powers reported a case of "Double Chopart Amputation of Feet," with exhibition of patient. Discussion by Drs. Rogers and Miel, and closed by Dr. Powers.

The next paper on the program, entitled, "The Physician in Relation to the Dispensing of Medicine," was read by Dr. J. Tracy Melvin.

Discussion by Drs. Whitney, Wilson, J. F. Elliott, McHugh, Blaine, Tyler, Miel and Stuver. Dr. Melvin closed the discussion.

Dr. T. E. Taylor presented a paper on "Occipito-Posterior Positions." Discussion by Dr. T. Mitchell Burns, of Denver.

A motion was made by Dr. Jayne that the reading of the president's address be made a special order of business at 3 o'clock at the afternoon session. Seconded; carried.

Dr. Kahn: Last year a prize was offered by the society for the best paper on "Quackery," the papers to be subjected to

a committee which passed judgment upon them. I think that some time should be spent for the reading of the prize essay. I move that some special time be set for the reading of the same. Seconded; carried.

It was moved and seconded that the reading of the prize essay be made a special order of business for 2:40 at the afternoon session. Carried.

The following papers were read by title:

"The Treatment of Typhoid Fever, with Special Reference to Intra-Rectal Injections of Normal Salt Solution," by Dr. E. Stuver, of Fort Collins.

"The Treatment of Inveterate and Relapsed Cases of Club-foot," by Dr. G. B. Packard, of Denver.

"A General Consideration of the X-Ray in Medicine and Surgery: Its Medico-Legal Aspects," by Dr. G. H. Stover, of Denver.

"Report of Cases of Appendicitis," by Dr. F. N. Cochems, of Salida.

"A Further Report on Cases of Tuberculosis Treated by Intravenous Injections of Sodium Cinnamate," by Dr. Alfred Mann, of Denver.

"An Outbreak of Pyæmia Simulating Bubonic Plague," by Dr. J. N. Hall, of Denver.

The society took a recess until 2 o'clock.

AFTERNOON SESSION.

The society was called to order at 2 p. m., in the ordinary of the Brown Palace Hotel, by the president.

As there was no urgent business, the regular scientific program was taken up.

Dr. Van Zant presented a paper entitled, "The Chest Pan-

tograph and the Manometer: Their Clinical Use and Value." A clinical demonstration was made. Discussion by Drs. Taussig, Tyler and Munn.

Dr. W. T. Little, first vice-president, here took the chair.

The next paper on the program, "A Study of the Pulse, Temperature and Respiration in the Diagnosis and Prognosis of Certain Diseases of the Brain," was read by Dr. J. T. Eskridge and discussed by Drs. W. J. Rothwell, of Denver, and McDowell, of Longmont. Dr. Eskridge closed the discussion.

The Chairman: By a motion carried at the meeting this morning it was resolved that the prize essay by Dr. W. B. Davis, of Pueblo, should be a special order of business at 2:40.

Dr. Jackson then read the prize essay by Dr. Davis.

The Chairman: By a motion seconded and carried at the morning session it was resolved that the president's address should be made a special order of business at 3 o'clock.

The president then delivered his address.

The President: The next order of business is the report of the committee on admissions, by Dr. C. K. Fleming, chairman.

Dr. Fleming submitted the report for the committee on admissions, recommending that the following physicians whose names appeared on printed ballots be elected to membership:

William R. Hoch	Pueblo, Colo.
Osse Wallace Hoffman	Denver, Colo.
Samuel B. Childs	Denver, Colo.
H. Arron Lord	Crestone, Colo.
Donald Kennedy	Denver, Colo.
W. A. Cundy	Denver, Colo.
Edmund K. Macomber	Delta, Colo.
John A. Murray	Denver, Colo.
H. W. Hoagland	Colorado Springs, Colo.
C. V. Marmaduke	Pueblo, Colo.
W. T. H. Baker	Pueblo, Colo.
David P. Mayhew	Colorado Springs, Colo.

George F. Libby.....Colorado Springs, Colo.
E. A. Whitmore.....Leadville, Colo.
W. J. LeRossignol.....Rifle, Colo.
John B. Wrightsman.....Mancos, Colo.
K. Hanson .....Grand Junction, Colo.
Arthur G. Taylor.....Grand Junction, Colo.
G. W. Holden.....Denver, Colo.
James B. Sanford.....Castle Rock, Colo.
Alfred P. Busey.....Pueblo, Colo.
Clarence L. Wheaton.....Denver, Colo.
O. J. Mayne.....Como, Colo.
John W. Smith.....Crestone, Colo.
H. M. Cohen.....Victor, Colo.
George H. Cattermole.....Boulder, Colo.
Herbert A. Black.....Pueblo, Colo.
W. H. Campbell.....Pueblo, Colo.
A. R. Sollenberger.....Colorado Springs, Colo.
C. A. Ferris.....Denver, Colo.
W. A. Wiliamson.....Rockvale, Colo.
M. J. Sanborn.....Brookside, Colo.
W. E. Turner.....Brush, Colo.
C. B. Richmond.....Denver, Colo.
L. B. Pillsbury.....Spring Gulch, Colo.
A. Anderson .....Denver, Colo.
John S. Miller.....Denver, Colo.
P. B. Godsman.....Burlington, Colo.
P. O. Hanford .....Colorado Springs, Colo.

The election of members being in order, the president appointed as tellers Drs. H. E. Warren, G. E. Tyler and A. S. Taussig, all of Denver.

Dr. Eskridge moved that the secretary be directed to cast the ballot for the society for all the names presented, provided that there was no objection by any persons present.

There being no objection, the secretary cast the ballot.

The President: The next order of business is the report of the committee on place of meeting, by Dr. W. B. Davis, chairman.

Dr. Davis: The committee on place of meeting wishes to report in favor of Pueblo. This is the only report the committee has to make. The committee has under consideration, however, a proposition that every third year our annual meeting should be held in Denver, and each of the intervening two years should be held somewhere else in the state. It was thought better, however, not to present this as a resolution at this time; but, if it should prove that it would be beneficial to the society, the matter can be brought up at some future time. In Texas the state society meets every third year in the capital of the state, and every second year they meet where the different physicians of the state are more easily induced to attend. The society is thereby more prosperous. If we could accomplish that in Colorado, I believe we could more than treble the membership in this state society. The only thing the committee has to report, however, is that the society meet in Pueblo next year.

It was moved and seconded that the report of the committee on place of meeting be accepted. Carried.

The President: The next order of business is a committee report which was passed on the first day—the report of the committee on history of medicine in Colorado, by Dr. C. D. Spivak, chairman.

Dr. Spivak submitted his report.

The President: You have heard the report of the committee on history of medicine in Colorado. What shall be done with it?

Dr. Sewall: I move that the report be accepted and the committee be continued.

It was moved and seconded that all unread papers, detailing the report of history of medicine in Colorado, be read by title and published in the proceedings. Carried.

The President: The next order of business is the report of the committee on nominations, by Dr. Hopkins, chairman.

Dr. Hopkins: The committee on nominations presents the following names for the various offices of the society:

For President—

Dr. John Law, of Leadville; Dr. R. W. Corwin, of Pueblo; Dr. Frank Finney, of La Junta.

For First Vice-President—

Dr. W. W. Grant and Dr. J. W. O'Connor, of Denver.

For Second Vice-President—

Dr. F. N. Cochems, of Salida, and Dr. P. J. McHugh, of Fort Collins.

For Third Vice-President—

Dr. T. J. Forhan, of Trinidad.

For Corresponding Secretary—

Drs. H. B. Whitney, Hobart E. Warren and J. M. Blaine, all of Denver.

For Recording Secretary—

Dr. Minnie C. T. Love, of Denver, and Dr. Charles H. Call, of Greeley.

For Assistant Recording Secretary—

Dr. J. Tracy Melvin, of Saguache.

For Treasurer—

Dr. Wm. J. Rothwell, of Denver.

Board of Trustees same as last year.

Trustees—

Drs. J. T. Eskridge, A. Stedman, W. E. Wilson, S. E. Solly, E. J. A. Rogers, H. Work and J. N. Hall.

Committee on Admissions.

Drs. C. K. Fleming, U. D. McDowell, C. A. Powers, M. Ballin and F. R. Coffman.

For Delegate to the House of Delegates, American Medical Association—

Drs. J. N. Hall and C. K. Fleming, of Denver. Alternate, Dr. P. F. Gildea, Colorado Springs.

The President: The first order of business will be the election of the president.

Dr. Finney: The committee on nominations, which has just reported, has done me the honor to place my name on the list of nominations for president of this society. I will state that I have long been a member of this society, have taken a great deal of pride in the membership and always tried to attend its meetings, to take part in its procedings in my poor way; and it gives me great pleasure to be thus honored, knowing my own unworthiness. Mr. President, the committee has named other gentlemen for this office—gentlemen who have grown gray in the service—and gentlemen whom, in honoring, this society will do honor to itself. I am young, Mr. President, and there is plenty of time for me. If it prove satisfactory to this society, I beg leave to be allowed to stand aside.

Dr. Law: I wish to thank the committee who has mentioned my name for this office. At the same time I wish to withdraw. There will be only one candidate remaining, and I move that the secretary cast the ballot for the society for Dr. Corwin. Seconded; carried.

The secretary cast the ballot of the society and Dr. Corwin was elected president.

The President: I shall appoint Dr. Law and Dr. Finney a committee to escort Dr. Corwin to the platform.

The president-elect was escorted to the platform by said committee.

The President: It is a pleasure and I likewise deem it a high honor to introduce your newly-elected president, Dr. R. W. Corwin, of Pueblo.

Dr. Corwin: Mr. President and Members of the State Medical Society—It is impossible for me to express my appreciation of the honor you have conferred upon me by making me your president. I thank you all most kindly for this gift, the greatest in your power to bestow. I assure you, I realize along with it go responsibilities, but they will be lessened through your assistance, which I am sure I may always feel free to ask.

Pueblo has been highly favored this year. To it goes the prize essay. You have chosen the "Valley City" for your next place of meeting, and from the Pueblo Medical Society you have selected your president. Next June, Pueblo will prove its gratefulness—warmly. Pueblo always takes care of all doctors who come to its mild and genial clime. Davis is in a hospital; Rice, in a consumptive home; Work, in an asylum, and Grant never fails to get into the insane institution of the state when he comes to Pueblo. I assure you when you visit Pueblo next June, you will be taken care of and have a hot time. You have many friends down there, and they will make it warm for you.

The President: The next order of business is the election of first vice-president.

Dr. O'Connor: I wish to thank the committee for the nomination and respectfully withdraw in favor of Dr. Grant.

Dr. Tyler: Mr. President, I move you that the secretary be instructed to cast the ballot of the society in favor of Dr. Grant. Seconded; carried. The secretary then case the ballot and Dr. Grant was declared duly elected vice-president.

The President: The next order of business is the election of second vice-president. The committee has presented the names of two candidates, Drs. F. N. Cochems and P. J. McHugh.

Dr. Cochems withdrew in favor of Dr. McHugh.

It was moved and seconded that the secretary cast the ballot of the society for Dr. McHugh. Carried.

The secretary cast the ballot, and Dr. McHugh was duly elected second vice-president.

The President: The next order of business is the election of third vice-president. The nominating committee presents the name of one candidate, Dr. T. J. Forhan.

It was moved and seconded that the secretary cast the ballot of the society in favor of Dr. Forhan for third vice-president. Carried.

The secretary cast the ballot of the society for Dr. T. J. Forhan, who was duly declared elected.

The President: The next order of business is the election of the corresponding secretary. The committee presents the names of three members: Drs. H. E. Warren, H. B. Whitney and J. M. Blaine.

Dr. Warren and Dr. Whitney withdrew in favor of Dr. Blaine.

Dr. W. B. Davis moved that the secretary cast the ballot of the society for Dr. Blaine. Seconded; carried.

The secretary cast the ballot and Dr. Blaine was duly declared elected corresponding secretary.

The President: The next order of business is the election of recording secretary. The committee presents the names of two candidates: Dr. Chas. H. Call and Dr. Minnie C. T. Love.

Dr. Call withdrew in Dr. Love's favor.

It was moved and seconded that the chair cast the ballot of the society for Dr. Love. Seconded; carried.

The chair cast the ballot and Dr. Love was duly elected recording secretary.

The next order of business was the election of assistant recording secretary. It was moved and seconded that the secretary cast the ballot in favor of Dr. J. Tracy Melvin, the only candidate for this office.

The secretary cast the ballot for Dr. Melvin, who was duly declared elected.

The society then proceeded with the election of treasurer. The committee presented the name of but one candidate, that of Dr. W. J. Rothwell.

It was moved and seconded that the secretary cast the ballot in favor of Dr. Rothwell. Carried by a rising vote. Dr. Rothwell was elected treasurer.

The next order of business was the election of the board of trustees. The committee presented the following names:

Drs. J. T. Eskridge, A. Stedman, W. E. Wilson, S. E. Solly, E. J. A. Rogers, H. Work and J. N. Hall.

It was moved and seconded that the secretary cast the ballot in favor of the names presented. Carried.

The secretary cast the ballot and the board of trustees as presented by the committee was duly elected.

The next order of business was the election of the committee on admissions. The committee presented the following names:

Drs. C. K. Fleming, U. D. McDowell, C. A. Powers, M. Ballin and F. R. Coffman.

It was moved and seconded that the secretary cast the ballot of the society in favor of these names. Carried.

The secretary thereupon announced that she had cast the vote of the society in favor of the committee on admissions as presented by nominating committee.

The President: The society is known to be entitled to one delegate to the house of delegates of the American Medical Association, for the meeting of 1902. The committee reports the names of two candidates: Drs. J. N. Hall and C. K. Fleming.

Dr. Hall withdrew in favor of Dr. Fleming.

It was moved and seconded that the secretary cast the ballot of the society for Dr. Fleming. Seconded; carried.

The secretary cast the ballot of the society and Dr. Fleming was declared elected as delegate to the house of delegates.

Dr. P. F. Gildea was then appointed as alternate.

Dr. Spivak: I move that a committee be appointed whose duty it shall be to request all medical societies of the state of Colorado to devote one regular or special meeting to the discussion of the question of establishing a local medical library, or, if that is not feasible, of increasing the efficiency and membership of the library of the Colorado Medical Library Association, located in Denver.

It was moved by Dr. Tyler that this motion be referred to the committee on medical societies for such action as they may deem wise, and that the committee be given power to act. Seconded; carried.

It was moved and seconded that a vote of thanks be extended to Dr. Hershey, chairman of the executive committee, for his earnest and excellent work. Amended to include all retiring officers. Seconded; carried.

The meeting then adjourned *sine die*.

By-Laws.

ARTICLE I.

MEMBERS.

Any regular graduate of medicine and surgery may become a member of this society, who, by his adherence to the Code of Ethics of the American Medical Association, shows himself entitled to the confidence and fellowship of his medical brethren, and who, by his general conduct and mode of life, proves himself worthy of being a member of one of the learned and liberal professions.

ARTICLE II.

Section 1. Every candidate for membership in the Colorado State Medical Society shall make a written application to the committee on admission, and such application shall be accompanied by a diploma or certificate vouching for possesion of the same from some regular medical college, the requirements of which conformed to those for membership in the American Medical Association at the time the diploma was issued, and his reputation shall be vouched for, in writing, by at least two members of the society.

Sec. 2. If this committee shall report favorably thereon to the society, the candidate shall be balloted for, and the approving vote of three-fourths of the members present shall be necessary to his admission.

ARTICLE III.

No individual who shall be under sentence of expulsion or suspension from any state or local medical society of which he

may have been a member, or whose name shall have been, for non-payment of dues, dropped from the rolls of the same, shall be received as a member of this society, or be allowed any of the privileges of a member, until he shall have been relieved from the said sentence or disability by such society, or shall have paid up all arrears of membership; nor shall any person, not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the State Medical Society of Colorado.

ARTICLE IV.

Honorary membership may be conferred by a vote of two-thirds of the members present at any regular meeting of the society, upon worthy and distinguished medical gentlemen.

ARTICLE V.

INITIATION FEE.

All the members of the society (honorary excepted) shall, at the time of their admission, sign the constitution and pay an initiation fee of $5, nor shall membership be consummated until the provisions of this article are complied with.

ARTICLE VI.

ASSESSMENTS.

All members shall pay such annual assessments as may be made from time to time by the society. Said assessments to fall due at the annual meeting when made.

ARTICLE VII.

OFFICERS.

The officers of this society shall be a president, three vice-presidents, designated and elected specially as first, second and third vice-presidents; a corresponding secretary, a recording secretary, a treasurer and a standing committee on admission of members, all of whom shall be elected annually by ballot, and

by a majority vote, at the regular meeting, to serve until their successors are duly elected and qualified.

ARTICLE VIII.

BOARD OF TRUSTEES.

The members of this society shall also, at each annual meeting, elect a board of trustees, consisting of seven members —of which board the officers-elect of this society may constitute a part—in whom shall be vested the government of the society and the management of its business. The board shall be authorized to elect their own officers, and shall serve until their successors are duly elected and qualified.

ARTICLE IX.

COMMITTEES.

The following standing committees shall be annually appointed by the president: First, an executive committee; second, a committee on finance; third, on publication; fourth, on medical ethics; fifth, on medical societies; sixth, on necrology; seventh, on legislation; eighth, on by-laws; ninth, on sanitation; tenth, tuberculosis in Colorado.

ARTICLE X.

DUTIES OF OFFICERS.

It shall be the duty of the president to preside at all regular meetings of the society, enforce a due observance of the constitution and by-laws, see that all members of committees and officers perform their respective duties, appoint all committees not otherwise provided for, give the casting vote only, sign diplomas and all other official documents requiring his signature and perform such duties as pertain to his office by usage and custom.

ARTICLE XI.

The vice-presidents shall assist the president in the performance of his duties, and in his absence shall preside in the order of their rank.

ARTICLE XII.

Section 1. The corresponding secretary shall conduct the correspondence of the society, notify the chairmen of committees of their appointments, and request them to answer in writing whether or not they accept; give due notice of annual meetings, sign diplomas, and certify to all official acts requiring the same; receive the signature and initiation fees of all duly elected members and the annual dues of all members, transferring all moneys so received to the treasurer; have the charge of all books, manuscripts, instruments, preparations and other scientific property belonging to the society, and shall keep a catalogue of the same, and report on the condition of the same at the annual meetings. The corresponding secretary shall receive, as compensation for the faithful discharge of his duties, the sum of one hundred dollars ($100) per annum.

Sec. 2. The recording secretary shall keep correct minutes of the proceedings of the society, and make a full report of the discussions on all papers, take charge of the minute books and other documents and papers read before the society immediately at the close of each session, and keep them during the intervals, subject to the inspection of any member desirous of so doing.

He shall receive as compensation for the faithful discharge of his duties the sum of $50.00 per annum. He shall, in conjunction with the chairman of the executive committee employ a stenographer to assist in recording all papers and discussions and preparing same for committee on publication, said stenographer to be paid from the funds of the society.

ARTICLE XIII.

The treasurer shall receive all moneys due to the society, and pay all bills endorsed by the finance committee and countersigned by the president, keeping correct accounts of the same and making a full and detailed report at the annual meeting.

ARTICLE XIV.

Any member who shall fail to pay his dues for a period of

three years shall be dropped from the roll of membership, and so notified by the secretary.

ARTICLE XV.

DUTIES OF COMMITTEES.

Standing committees shall keep regular minutes of their proceedings, and furnish an authentic copy to the secretary, and make a written report at the annual meeting.

ARTICLE XVI.

It shall be the duty of the committee on admissions, upon receiving the names of candidates for membership, to make inquiry and report such as may be found worthy to the society, which may thereupon elect them. Should the committee fail to report upon such nominations submitted to them, any members having made such nominations may renew the same directly to the society, in which case a vote of four-fifths of the members present shall be requisite to constitute an election.

ARTICLE XVII.

The executive committee shall digest and prepare the business of each meeting, provide suitable rooms for the purpose of the society, recommend plans for the promotion of its objects, and in all things protect and look after the general interests of the society.

ARTICLE XVIII.

The committee on finance shall superintend the monetary affairs of the society, inspect and audit all bills and accounts of the treasurer, and make such assessment, by a *pro rata* tax upon the resident members, as may be necessary for the incidental expenses, subject, however, to the approval of the society.

ARTICLE XIX.

The committee on publications shall superintend the printing of such papers, with the full discussion thereon, as may be ordered to be published, so that they may be issued on uniform

paper. The publication of the Transactions shall not be permitted until final revision of proof and its adoption, with permission to print, signed by a majority of the committee on publication, and under the title "Transactions."

ARTICLE XX.

The committee on ethics shall hear all complaints of any breach of etiquette or violation of medical ethics. It shall decide all questions of ethics submitted to it. If any member shall be charged in writing by any other member of the society with any violation of the provisions of the by-laws, or with unprofessional conduct, a copy of such charge shall be furnished him; himself and his accuser cited to appear; when the committee shall proceed to hear the case, reserving its decision to be reported to the society, when its action may be affirmed by a vote of two-thirds of the members present.

ARTICLE XXI.

The committee on medical societies shall consider and report on the organization of such medical societies as desire to become auxiliary to the State Medical Society, and generally take charge of this department, making at each annual meeting as complete a report as practicable.

ARTICLE XXII.

The committee on necrology shall report the death of any member of the society, with a brief biography, and this report shall be published in the Transactions.

ARTICLE XXIII.

The committee on legislation shall report to the society any matter concerning its welfare which requires state legislation, and see that the same is properly presented to the legislature for action, if so instructed by the society.

ARTICLE XXIV.

The committee on by-laws shall report to the society any needed change in its by-laws.

ARTICLE XXV.

DISCIPLINE.

A member may be expelled, suspended or reprimanded by a vote of two-thirds of the members present at any annual meeting, which vote shall be had in consequence of a report from the committee on ethics, and which may be confirmed by a majority of the board of trustees.

ARTICLE XXVI.

Any member wishing to withdraw from the society shall be permitted to do so on his written request, after he shall have presented the treasurer's receipt for all moneys due.

ARTICLE XXVII.

The regular meeting shall be held annually, and shall commence on the third Tuesday of June. The place of meeting shall be determined by a committee of five appointed by the society, and a banquet shall be given on the evening of the last day, as arranged for by the executive committee.

ARTICLE XXVIII.

Special meetings shall be called at any time by the board of trustees.

ARTICLE XXIX.

At a meeting the presence of nine resident members shall be necessary to constitute a quorum.

ARTICLE XXX.

The order of proceedings shall be as follows:

1. Opening of meeting by prayer.
2. Reading of minutes by the secretary.
3. Annual address by retiring president.
4. Annual reports of officers and standing committees.
5. Election of officers.

6. Annual and special committees' reports.

7. Voluntary papers, contributions, reports.

8. Annual assessment shall be laid by resolution.

9. Miscellaneous business.

10. President-elect shall assume the chair and announce committees for succeeding year.

ARTICLE XXXI.

These by-laws may be repealed, annulled, altered or amended at a regular meeting, on the recommendation of two-thirds of the members present.

LIST OF THE PRESIDENTS OF THE SOCIETY FROM ITS ORGANIZATION.

1871—*R. G. Buckingham, M. D.....Denver
1872—*W. F. McClelland, M. D.....Denver
1873—*G. S. McMurtrie, M. D.....Central
1874—*H. K. Steele, M. D.....Denver
1875—*W. H. Thacker, M. D.....Denver
1875— H. O. Dodge, M. D.....Boulder
1876—*W. H. Williams, M. D.....Denver
1877— T. G. Horn, M. D.....Colorado Springs
1878— A. Stedman, M. D.....Denver
1879— B. P. Anderson, M. D.....Colorado Springs
1880— F. J. Bancroft, M. D.....Denver
1881— H. A. Lemen, M. D.....Denver
1882— P. R. Thombs, M. D.....Pueblo
1883— W. R. Whitehead, M. D.....Denver
1884—*Jesse Hawes, M. D.....Greeley
1885—*J. C. Davis, M. D.....Denver
1886— J. W. Graham, M. D.....Denver
1887— S. E. Solly, M. D.....Colorado Springs
1888— S. A. Fisk, M. D.....Denver
1889— J. W. Collins, M. D.....Grand Junction
1890— J. T. Eskridge, M. D.....Denver
1891— W. M. Strickler, M. D.....Colorado Springs
1892— W. E. Wilson, M. D.....Denver
1893— E. J. A. Rogers, M. D.....Denver
1894— Hubert Work, M. D.....Pueblo
1895— I. B. Perkins, M. D.....Denver
1896— Robert Levy, M. D.....Denver
1897— L. E. Lemen, M. D.....Denver
1898— W. A. Campbell, M. D.....Colorado Springs
1899— J. N. Hall, M. D.....Denver
1900— William P. Munn, M. D.....Denver
1901— W. F. Corwin, M. D.....Pueblo

*Deceased.

LIST OF PERSONS READING PAPERS—SESSION OF 1901.

Arbogast, B. A.
Ballin, M.
Beggs, W. N.
Bull, H. R.
Burns, T. M.
Cochems, F. M.
Corwin, R. W.
Davis, Will B.
Denison, Charles
Dow, William
Eskridge, J. T.
Finney, Frank
Fleming, C. K.
Freeman, L.
Freeman, R. B.
Gildea, P. F .
Grant, W. W.
Hall, J. N.
Hickey, C. G.
Hill, E. C.
Hopkins, S. D.
Jackson, E.
Jayne, W. A.
Kahn, S. G.
Kickland, W. A.
Levy, R.
Le Mond, R. F.
Little, W. T.
Love, M. C. T.
Mann, Alfred
Macalister, R. K.
McDowell, U. D.
McHugh, P. J.
Melvin, J. T.
Mitchell, Wm. C.
Munn, W. P.
Packard, Geo. B.
Perkins, I. B.
Pershing, H. T.
Pfeifer, O. J.
Powers, C. A.
Rogers, E. J. A.
Rothwell, P. D.
Sewall, Henry
Simon, S.
Spivak, C. D.
Stover, G. H.
Stuver, E.
Taylor, T. E.
Tyler, Geo. E.
Van Zant, C. B.
Warren, H. E.
Waxham, F. E.
Whitney, H. B.
Wilder, J. A.
Williams, A. H.
Work, Hubert
Zederbaum, A.

LIST OF THOSE WHO TOOK PART IN THE DISCUSSION OF PAPERS—SESSION 1901.

Ballin, M.
Blaine, J. M.
Bull, H. R.
Burns, T. M.
Cochems, F. M.
Craig, W. B.
Davis, Will B.
Elliott, J. F.
Eskridge, J. T.
Espey, J. R.
Finney, Frank
Forhan, T. J.
Freeman, L.
Gildea, P. F.
Grant, W. W.
Hall, J. N.
Hill, E. C.
Hopkins, S. D.
Jackson, E.
Levy, R.
Lobingier, A. S.
Macomber, E. K.
McHugh, P. J.
McDowell, U. D.
Miel, G. W.
Munn, W. P.
Parkhill, C.
Powers, C. A.
Rogers, E. J. A.
Rothwell, P. D.
Rothwell, Wm. J.
Stover, George H.
Stuver, E.
Taussig, A. S.
Tyler, Geo. E.
Van Zant, C. B.
Warren, H. E.
Waxham, F. E.
Whitney, H. B.
Wilson, W. E.

President's Address.

BY WM. P. MUNN, DENVER, COLO.

Members of the Society:

I desire at this time to make grateful acknowledgment of your courtesy in placing me in this honorable position, and to thank you for that cordial co-operation which has enabled your officers and committees to present such a varied and valuable scientific program. In the scope of subjects considered and in the ability with which they have been presented, our proceedings at this meeting may well challenge comparison with those of scientific societies of greater pretensions and of national or international extent. We have reason to be proud of our professional organization and the attainments of its membership, although located in a frontier state, far distant from the older and more established centers of culture in the East, and whose population, even at this time, averages but five to the square mile.

This is the thirtieth anniversary of the establishment of this organization. Colorado was in 1871 but a territory, and at that time recently connected with civilization by the construction of the Union Pacific and Kansas Pacific Railroads. The meeting of the Territorial Society was called by Dr. W. H. Williams, corresponding secretary of the Denver Medical Association, in accordance with a resolution adopted by that organization. The members met in Denver, a town which by the United States census of the preceding year had a population of about 4,700, and which had remained practically without growth during a period of ten full years. On the 19th of September, 1871, sixteen members of the profession were in attendance upon the convention and organized this society, electing Dr. R. G.

Buckingham president. From that date to the present time the meetings have been held annually, the membership has steadily increased and the society has become, what we hope it will always remain, *the* representative organization of medical men and women of Colorado. We have in our active membership a larger proportion of the physicians of the state than has almost any other state medical society, and our state maintains at this time a larger proportionate representation in the American Medical Association than does any other state. Certainly none of the smaller states is represented by men whose contributions to medical literature and work for the welfare of the profession, in general, entitle them to more universal recognition.

With so many just causes for congratulation as to increase in numbers, influence and genuine value to the community, it is incumbent upon us to deal stringently with ourselves in order that we may continue to deserve these encomiums. With increase of powers come increase of opportunities for doing good, increase of duties both toward our profession and toward the general public, increase of responsibilities to those who are entrusted to our care and supervision.

Membership in the medical profession ought to mean more than it did a generation ago; as a matter of fact it does mean more. The avenues of entrance may be greater in number, but in so far as they are under the supervision of the profession itself, they are more carefully guarded. These safeguards must be constantly increased and faithfully maintained. The illiterate, the impractical, the immoral and the irresponsible should be kept from entering into the heritage which belongs only to those that have had a careful training for their professional duties and who assume them with a full and realizing sense of their nature. It is not improper to dwell upon the fact that in regard to these matters the profession itself, while it may have had shortcomings in the past and perhaps has some few remaining, is still far in advance of the general public in its endeavor to render to that public a proper performance of duty. The general public seems yet to imagine that we are actuated in our endeavors to protect them, by the worn-out, played-out and utterly mean spirit of commercialism that actuates themselves in many of their so-called public movements. They fail to realize that the medical profession is, of all professions and occupations, the one that has most definitely embodied in its ethical standards and seeks

to enforce in the every day life of its members the genuine spirit of altruism, the fundamental principle of Christianity, in serving our fellow men as actual brethren. Failing to apprehend such a life motive, the press and the people fail to apprehend or to gain the faintest conception of many of our most disinterested efforts to render public service. As a consequence, measures for the protection of the weak against the strong, the suffering poor from the rapacity of the charlatan, and the deluded rich against the impositions of the fraudulent pretender, thus fail to enlist the intelligent support of our legislators or the approval of our executives. What is it to us that the whole population should be protected from small-pox by the universal enforcement of vaccination? If we were animated by the spirit of commercialism, it would be sufficient for us to protect ourselves and our families by the secret and repeated application of that beneficent measure, leaving those who disbelieved and those who opposed, to pay in their own bodies and from their own pockets the penalty of their obstinate opposition. This is the course that would give most profit to the medical profession; financially it would be the best policy; but the spirit of ethical medicine condemns such a course most emphatically. Under the power of absolute knowledge and absolute conviction of the beneficent results of vaccination, it is our plain duty and our high privilege to endeavor that every member of the community, however poor, ignorant, stupid or misguided he may be, shall share with us the protection guaranteed by repeated successful vaccination, until in the progress of time, through lapse of opportunities for propagation, small-pox shall absolutely die out and the human race be freed from this type of pestilence.

So it is with other preventable diseases. What is it to us that a polluted water supply causes typhoid fever? It is not many years since, in this and other communities, more than half of the income of every busy practitioner came from the prevalence of this one readily preventable disease. From the purely commercial aspect, its continued prevalence as a source of perpetual income to the physician would be most desirable. We know enough to protect ourselves and our own families from its ravages, even when cities are being decimated through the pollution of their water supplies. We can boil every drop of water that we ourselves drink; we can leave the community, our fellow citizens and our friends and our patrons to pay, with the

pangs of sickness, the griefs of bereavement and the hardly earned savings of laborious years, the penalty of their ignorance and their indifference to sanitary reforms. There may be men within our ranks so lost to sense of honor and public duty, so eager in their pursuit of the almighty dollar, as to hold such sentiments and practice such methods. But let us thank God that the ethics of medicine condemn such men so strongly as to make them rare indeed,—so rare, and so contemptible in the eyes of their fellow practitioners, that they dare not hold their heads erect or wag their dishonorable tongues in meetings of their peers. We need not fear comparison with men in other ranks of life and other professions as to our public spirit; we wipe out when we can the very disease conditions that bring business to our offices; we constantly endeavor to eradicate the pestilence that threatens, not ourselves, but our patrons. The poorest doctor who sits in this room to-day is a better example of civic patriotism than the richest and most influential millionaire or fictitious philanthropist, who, steeped in his pride of purse, secure from punishment through control of courts and public officers, goes unwhipped by justice after having connived at the sewage poisoning of the water supply of more than a hundred thousand of his fellow citizens.

What a woful neglect of immeasurable opportunities on the part of such men! Giants in intellectual capacity, captains of industry and of commercial enterprise, life's struggle is for them "dwarfed of all genuine attainments." They play out the great game of life, satisfied with no better exhibition of power than comes from the mere forceful control of the ignorant and unthinking, satisfied to appeal to the purchasable and the brutish in mankind; but the rare happiness of leadership in intellectual attainment cannot be theirs, for they contemn the appeal to intelligence, they despise all service to their fellow-men except that which represents financial profit, and they oppose with bitter animosity those who, daring to fling off the bonds of commercial servitude, assert the higher duty of serving mankind for the simple joy of service, the recompense of responsibilities faithfully borne, and the obligation to save, ennoble and make happier the lives of the common people. That there are a few notable exceptions among men of great wealth, serves but to emphasize the shortcomings of the common herd of millionaires in this regard. They only imagine, with short-sighted inappreciation, that

such establishments as the Carnegie Laboratory for pathologic and bacteriologic research and the Rockefeller endowment for sanitary researches in the associated great universities, have been made for advertising purposes or as an exhibition of weakening cerebral powers in old age.

There is a very practical side to the consideration of this subject. The medical profession, it is true, has been in the past the most notable conservator of public welfare in sanitary affairs, and it must still continue to exercise this office. But public health problems have so increased in number and difficulty that the general practitioner is only able in a very imperfect way to apprehend them and to point out the method of their solution. Sanitary science has become a specialty not altogether limited to medical men; engineers and biologists are equally interested in it; the veterinary, the chemist, the architect, the sociologist and the publicist must all contribute to the equipment of the properly organized department of public health. Taken all in all, the medical man remains the one who should by education and training become the official sanitarian. It is nevertheless conclusively evident that the simple medical course of the schools does not and cannot supply the instruction necessary to make a thoroughly competent officer of public health. In some foreign countries this fact has long been realized and the degree equivalent to Doctor of Public Health is given to those who, after having graduated in medicine take special courses of instruction in the branches that deal directly with sanitation. I have already indicated briefly the other professions that are more directly interested in sanitation. It will thus be appreciated that technical instruction in a number of branches far removed from the ordinary medical course should be a part of the course in the school for the instruction of medical health officers. I place biology in its practical relations and certain of the ordinary engineering studies as the most important in this instruction. House drainage, the construction of systems of sewerage, the methods of sewage disposal and of sewage purification are vital elements of sanitary work; these again are intimately connected with questions of water supply, involving methods of water collection and storage, the various methods of filtration and the very essential methods of determining whether special systems of storage and filtration are effective in securing purification of a water which has been subject to contamination before its collection. The study of this

last and most vital of all problems in connection with water supply involves some chemical knowledge, especially a full realization of the narrow limitations of chemistry in this regard, and a very wide, full and accurate knowledge of biology. The efficiency of a filtration plant for example can only be determined by prolonged, day to day biologic investigation of the filtered water as compared with the raw water before application to the filters. Thereafter the results of these investigations should be studied in connection with the occurrence of water-borne disease in the community and the distribution of water from the various sources of supply. In these days it is not usual for any city to have a supply derived from one source only. Complete knowledge of the various areas supplied from the different sources is therefore essential to any analytic study of the distribution of the water-borne diseases. Examples of the value of such studies may be found in the records of cholera distribution in the city of Hamburg in 1892. Altona is an adjoining town, so practically continuous with Hamburg that the boundary line runs through the middle of a thickly built up street. On one side of this street the houses were supplied with water from the Altona system, which was filtered through slow sand filter beds; there were no cases of cholera among the residents on this side of the street. On the other side of the street the Hamburg water supply, at that time unfiltered water from the Elbe river, was used; there was cholera in almost every house on that side of the street. The spotted maps recorded these facts so plainly that no labored argument was necessary to explain them. Filtration works under construction for Hamburg at the time of the outbreak of the epidemic were therefore pushed to completion with the utmost rapidity, and when filtered water was put in use the epidemic ceased as suddenly as it began. Equally good examples of the value of the system of mapping and marking premises infected with typhoid fever are to be found in the records of the Plymouth outbreak of 1883 and the Denver outbreak of 1896.

Sewage disposal and purification must assume greater importance as the years go by in every civilized community. To simply get the liquid wastes of a city or town out of sight by running them into the nearest water course, can only be compared to that kind of housekeeping that "cleans up" by sweeping the dirt behind or under the furniture. It is out of sight, but it still exists and has an effect on the health of some one. Experimental

investigations conducted more than ten years ago under the direction of the Massachusetts State Board of Health, amply demonstrated that the most polluted sewage can be completely purified by filtration. It must not be supposed that the term filtration means simply to run water through any old thing that some ingenious or ignorant inventor chooses to call a filter. Filtration properly carried on is a process of biologic purification of water by removal of organic impurities while the water is slowly passing through thick layers of sand upon which or in the interstices of which nitrifying organisms are lodged. These nitrifying organisms destroy the pathogenic organisms when they are arrested in the layer of schmutzdecke or bacterial jelly. For the purification of sewage it has been found that the nitrifying processes are probably rendered more active if the filtration is intermittent, that is, the filter is operated for twenty-four (24) hours and then lies idle for twenty-four hours; during this intermission the air finds its way into the interstices and a certain amount of fresh oxygen becomes available for the nitrifying process of the succeeding twenty-four hours.

The study of food supplies and methods of food analysis can hardly be omitted from the course in hygiene. The use of antiseptics and preservatives so universally attempted, the recognition of all the various adulterants, demand an extended line of investigations. To these food studies must now be added a fuller knowledge of the uses of bacteria in commerce as applied to foods, drinks and other commercial products. Meat and milk supplies can hardly be intelligently supervised without some comprehension of the great and growing field of investigation that the veterinarian has had opened to him within recent years by the new pathology of disease in the lower animals. Tuberculosis in dairy herds is alone a subject of vast enough import to demand the most intelligent supervision. The butcher and the dairyman lack the special knowledge that will enable them to comprehend this problem; it can be but the subject of the slightest passing notice in the average medical course; for this reason it must receive special and thorough attention in the course of instruction for health officers.

A good working knowledge of the contagious diseases is not readily obtainable by the average man except after many years of practice. The method of instruction for intending health officers would necessarily seem to involve some connection be-

tween the school of instruction and the administrative health authorities of some of the larger cities. Post-graduate students in the course of hygiene could do work in inspecting houses that harbor contagious disease, would have an opportunity to examine many cases, and would also receive clinical instruction in the wards of the contagious disease hospitals. Thus the man who would secure the degree of Doctor of Public Health or Doctor of Hygiene would have already acquired some working knowledge of the various eruptions and contagions. He would, perhaps, be competent to decide upon the nature of a doubtful eruption for the anxious general practitioner. Certainly for the good of the public service, all public health officers and medical inspectors should have such training as to render them especially competent in the recognition and treatment of contagious diseases.

It may be readily apprehended that the breadth of the subject which I have thus opened up is such that it is only susceptible of proper treatment by the state. It will involve co-operation of state and municipal authorities to such an extent that in many communities the time for its adoption will not be ripe for many years. The Laboratory of Hygiene, under control of the State Board of Health, should be the nucleus for the upbuilding of such a course of instruction. In a course covering one full year the post-graduate in medicine might receive the degree of Licentiate in Public Health, while for the course of two years the degree of Doctor of Public Health would be proper. With such a school of instruction, offering facilities for practical laboratory study, analytic work and lecture courses, supplemented by practical sanitary work under the direction of a properly administered city health office (such office ideally under an honest merit system), the State of Colorado could provide its cities and towns with ideally qualified men for the position of health officer. It may be urged that the proposed measures are impractical. They are only impractical for men who oppose the merit system in public affairs and who despise decent administrative methods. It is practical for England, France and Germany and even for Mexico to have a decent public health service; it has been practical to inaugurate such laboratories of hygiene as I have spoken of in Michigan and New York; Ohio and Vermont have undertaken to establish courses of instruction for health officers; the Chicago and the New York City Boards of Health each main-

tain courses of instruction at this time, both having been begun about the time of publication in the *Philadelphia Medical Journal* of an outline of study for such a course as suggested by myself.

So long ago as 1892 this society endorsed such a proposition, presented by myself, on behalf of our legislative committee, in a report urging the rehabilitation and reorganization of the State Board of Health.

With the intent of providing a nucleus for such a school of instruction in each state, I drew up, in 1895, and presented to the American Public Health Association a bill providing for an annual appropriation by the general government for the support of such a laboratory of hygiene in each state, where the commonwealth itself should manifest its interest in and desire for the institution, by annually appropriating an equal sum, not to exceed $15,000 per year for each state. This bill was practically drawn up on the same lines as the law which established and provided for the maintenance of the agricultural experiment stations in connection with the agricultural colleges of each state. Surely if the agricultural interests of any state are of sufficient value to justify the outlay of $15,000 each year by both the state and national government for simple experimental work in the study of plants and insects and irrigation problems, the interests of the public health are worthy of the expenditure of an equal sum. I believe that by some such method of legislation as that proposed, we shall ultimately be able to unify the public health interests of the whole country under one national bureau or department. It is of no import whether it at first has the dignity of a department with a cabinet minister as its head; that might subject it too much to political influence in its organization and operation. A bureau, such as the Marine Hospital Service now is under the Treasury Department, will be a more modest beginning. Its ramification into every state and the necessary co-operation and subordination of every state, secured through the potent influence of a government appropriation, conditionally made, would prove an impetus to public health work such as it has never before had in this country.

The very fact that such far-reaching and beneficent propositions for the benefit of the general public find their most suitable place of origin and most appreciative audiences in medical societies emphasizes the tremendous advances made in sanitary

matters during the one short generation that has elapsed since this society came into being. Yet this is but one of the lines of effort wherein mankind as a whole is greatly indebted to the work of our professional brothers.

To compare the present status of our art and each of its basic sciences with the status at the time of the organization of this society, a generation ago, might well be one of the efforts of this occasion. The record of thirty years advancement in the conditions of civilization has indeed been most remarkable in every field of knowledge and every branch of effort. We must ask ourselves candidly whether medicine and surgery have equally with other lines of knowledge and other activities of the world's effort, maintained their standing, advanced their standards or improved the conditions of human existence. We must assure ourselves first that we have done our full duty in the light of increased knowledge, and having done this, we may then justly claim from the world at large a full and ample appreciation of the work that has been done.

This demonstration has indeed been already made by more trenchant pens and reiterated by more persuasive voices than mine. In articles addressed to the general reading public, at the beginning of this new century of progress, Osler elaborated the progress made by general medical science during the closing century, while Keen demonstrated in detail the advances that had been achieved by surgical science. These papers have probably been read by all of you, as well as by many thousands of the public, for whose instruction and benefit they were originally designed. I shall therefore not attempt to duplicate, either in whole or in part, what they have already so well presented, but rather pass on to a brief consideration of a few of the other developments of the times which command the serious consideration of the medical profession.

It has been often asserted by the superficial and the ignorant that the progress of events tends to obliterate the family physician. Don't you believe it for one instant. There never was a greater field for him than to-day. The development of specialism has only been possible through the recognition by the general practitioner of medicine of the equipment necessary for technical treatment of some diseases. But specialism has its limitations, recognized only too well by those who practice the

specialties. In fact, no one can ever hope to become a genuine specialist until he has spent years in general practice of medicine. Thereafter, the longer he practices his specialty, be it with reference to the organs of special sense or the nervous system, or to the genital organs, he recognizes with ever broadening vision the relation of his narrow path to that broader highway upon which the general practitioner of medicine must pursue his professional career. It is true that in very large cities, narrower professional activity may become possible for certain men so situated that they can turn the patient without delay, and without sacrificing his interests, immediately into the hands of another follower of a narrow path; but in general this will not be possible. Even in a city the size of Denver, we find overworked and underpaid specialism seeking to right itself by the return of specialists to general practice, either of surgery or medicine. The bulk of the gynecologists are now accepting not only all kinds of surgery but considerable medical practice. Men who limited themselves to surgery alone a few years ago are again taking obstetric cases, gynecology, attending fevers, in fact resuming general practice. The lesson of all this is that specialism must have legitimate boundaries, set by nature and the inherent conditions of the people and their customs; otherwise specialism cannot survive.

Legitimate specialism is a plant of slow, sure and necessary growth. A knowledge of special diseases is necessarily predicated upon a preliminary and rather broad knowledge and experience of general medicine. Lack of appreciation of this fact lies back of the yearly influx of eye doctors, throat doctors and surgeons of limited experience and deadly facility with dangerous tools in untrained hands, just as much as it lies back of the crowd of osteopaths, refraction specialists and mind healers of one or another variety that afflict our community at this time. In a way the recent rapid advance in requirements for medical practice has also contributed to the apparent increase in numbers of these irregulars and bastard specialists of all varieties. Thirty years ago the time required to acquire a medical degree was so short that scores of the ignorant found their way into the army of legitimate medicine, bearing in their hands credentials of questionable scientific value, but legally good enough to give them the right to prey upon their fellow-men. We have been successful in driving them out of our ranks through the increased requirements of medical schools and increasing strictness of the

laws regulating the practice of medicine. But we were mistaken in supposing that the general public intelligence had reached a point from which it could view and appreciate the relative values of the genuine and the non-genuine in medicine. Our boasted civilization is but a thin veneer. The clairvoyant, the fortune-teller, the mind healer and the Christian Scientist are but a repetition in a different social organization of the voodoo doctor of the southern slaves, the medicine man and his incantations among our own western Indians or the enchanter of Egypt and India. The cult of semi-education which is ready to worship at the shrine of the many-husbanded Mrs. Eddy, of Boston, would be quite as ready, could it be moved to another land, to lend its children to the altars of Moloch and Ashtoreth, to throw themselves under the car of Juggernaut or to prostrate themselves before the Grand Llama of Thibet. The fraudulent healers, the visionaries, the blasphemers of both God and science, who pretend to know without seeing and to heal without knowing; who publicly scoff at all medicine and privately take the vilest forms of patented articles; who teach that everything is nothing and who in practice regard gold and silver as everything,—these are the people who in these latter days catch the ear and charm the eyes of a so-called intellectual literary world. In how much they differ from the medicine men and women of our aboriginal races or of the most debased negro tribes of Africa, no man knoweth. The incantations of the Apache medicine man are no more incoherent than the gibberish of the Eddyites; the audience of the one is composed of redskins draped in flannel blankets, the audience of the other is composed of whiteskins arrayed in silks and satins; but they are similar in character, about equal in intellectual attainments, and each as readily influenced by the mystery that attaches to the ignorant boastfulness of witch-women or the howling antics of the painted medicine man.

Degenerate literature during the last few decades teems with the ceaseless questionings, aimless reasoning and bitter reproaches of the representatives of charlatanry in science. One of the anachronisms presented by this subject is to be found in the character of the men and women who profess belief in the so-called new systems of cure. Take for example the so-called

Christian Science movement. Its very name is fraudulent, representing two classes of people who will have nothing to do with it; my experience may be unique, but I have never known a devout Christian to accept the beliefs of Mrs. Eddy, nor have I ever known any one having a knowledge of science to accept her doctrines. Yet there are not wanting others who flock to her standard; blasphemers who never gave a serious thought to a religious subject in their lives suddenly claim a right to masque under the name of "Christian" when it is associated with the designation of scientist; its other recruits are gathered from the ranks of those who despise not only knowledge but the straight and narrow path by which it is attained. Science is too rigid in its requirements for those who choose the designation of "Christian Scientists;" grubbing for facts is too slow and painful a process to be followed by those who yearn for the hysterical combination of a factless science with a Godless worship. It is to be regretted that these modern savages have omitted from their rituals the final and most valuable procedure of their American Indian and savage African predecessors. When the savage miracle worker failed to cure his patient by incantations, prayers or inunctions, the sorrowing friends promptly sacrificed him; the soul of the healer who failed and the soul of the unhealed patient entered the realms of darkness together.

This is neither the time nor the place, however, to do more than refer to these subjects with sufficient exactness to emphasize their importance. Manifestly we must maintain our own high standards and advance the lines of genuine medicine. To serve is, after all, the highest and most honorable of all vocations, and in service our profession is surpassed by none other. To keep that service efficient, honorable and honored we must work in harmony, maintain our medical organizations, promote loyalty to high ideals. In more intimate association with each other, through the medium of the county society and the state society, individual attainments promote kindly emulation and broaden our appreciation of each other, so that all petty jealousies and misunderstandings will gradually be wiped out. With a better appreciation of individual capabilities will come a readier recognition of individual rights and privileges, a greater willingness

to co-operate in all measures for professional advancement, a more complete confidence and personal friendliness. Thus with all disagreements eliminated, all interests harmonized and a universal striving for betterment of conditions, the medical profession may at last present that united front and disciplined action which will assure us the recognition by the law to which our integrity of motives, honesty of service and the results of our labors, have already given us ample title.

Prize Essay.

THE DANGERS TO THE PUBLIC HEALTH AND MORALS, ESPECIALLY TO YOUNG PERSONS, FROM QUACKERY AS PROMULGATED BY PUBLIC ADVERTISEMENTS.

BY WILL B. DAVIS, M. D., PUEBLO, COLO.

[The Colorado State Medical Society offered a prize of twenty-five dollars for the best essay upon this subject, for use in educating the general public regarding such dangers. The prize was awarded at the meeting of the society in June, 1901, to the essay here published, which had been submitted under the motto:

"He whose flight avoids the fray
May still secure the larger pay."—PUBLICATION COMMITTEE.]

A quack is "One who pretends to skill or knowledge of any kind which he does not possess."—Century Dictionary.

Public advertising does not, of itself, constitute one a quack, in the proper meaning of the term; but, as a rule, the physician who resorts to public advertising, either begins by pretending an ability not possessed, or early develops into a full-fledged quack, for he soon finds that mere pretense on his part is quite as fruitful of financial returns as the actual possession of all claimed ability.

Therefore, the temptation is too great to be resisted by ordinary human natures. With a full quota of the universal desire for gain on the one hand, and a notoriously gullible public upon the other, the doctor who resorts to public advertising at all, usually succumbs to the temptation, and pretends the impossible as well as the attainable. The public is credulous and will

believe the unreasonable as readily as the reasonable, at least to the desired end of the quack, which is to induce them to part with their money in the hopes of obtaining relief or cure. Neither may ever be obtained, but the quack is nevertheless as much the gainer financially as if they were actually wrought. Nor in event of failure does his reputation suffer in consequence, for he has none but a manufactured reputation—a claimed reputation—a reputation exactly in proportion to his pretensions, and the manner and extent of the public advertisements through which he heralds himself.

To cite one instance by way of illustration, and in proof of these assertions, we will take the case of the notorious Gun Wa Company of a few years ago.

The head and proprietor of the Gun Wa combination was the owner and manager of a gambling house in Pueblo, Colorado. He had in his employ, in the capacity of general scrubber and spittoon cleaner, a Chinese coolie, on a salary of three dollars and a half a week.

Being a shrewd schemer, and knowing the gullibility of the public, he conceived the idea of taking this Chinese spittoon cleaner, and dressing him up in the most imposing oriental garb, advertising him as the celebrated Chinese doctor, Gun Wa.

In twenty-four hours after last scrubbing the floor of the gambling den, this great and only Gun Wa was in Denver, one hundred and twenty miles north of Pueblo, donned in full oriental costume, and occupying most gorgeously furnished office apartments, posing as a great and just arrived Chinese physician.

His expected coming had been heralded through the press of Denver and other cities most profusely, and his ability to cure all manner of diseases was pretended to be so great, that the spacious waiting rooms of the coolie laborer were filled to overflowing, long before the beginning of his regular office hours.

Think of it, my Aesculapian colleagues! Think of it, ye lawmakers and men in authority! Think of it, ye of the ecclesiastic robes, many of whom are so ready to lend the influence of your clerical offices to advertising quacks! Think of it, ye of

the secular and religious press, whose purses are distended to a degree of complacent embonpoint through prostituting your professed missions to such ungodly ends! Think of it, all ye people who never lose an opportunity to confirm the more than truthful saying of the celebrated P. T. Barnum, which was in effect that the American people were fond of being humbugged, and the bigger the humbug, and the more they had of it, the better they were pleased!

Do not whiningly say that the essayist has selected the worst and most exceptional case for illustration. He has done no such thing. There are no good, better or best quacks. You had as well try to prove by Holy Writ the various degrees of sin, and their promised punishments accordingly.

No! we select this case, first, because of its remarkable success, and therefore its great prominence, which was secured through the same means by which all advertising quacks obtain patronage, namely, the use of printer's ink. Their degree of success depends upon both the amount and judiciousness in the use of printer's ink, and on that alone. In the second place, we took this illustration because we personally investigated the case, and know these representations to be true. And lastly, because the records of the United States District Court can be adduced to prove it.

Gun Wa held undisputed lead at Denver, and other places, over all advertising quacks for some two years or more, because his manager spent more money for advertising than all competitors, and we were reliably informed that it was no unusual thing for his daily office receipts to run up into the thousands. Yet he displayed the magnanimity (mainly because he had no diploma or examination certificate) to give such examinations as he made, and advice, free, only charging for the medicine furnished!

Gun Wa, during his short professional career, was probably the most thoroughly advertised quack ever known. His manager and owner certainly proved himself an adept as an advertising agent.

Gun Wa was only a tool in the hands of this astute gambler. His wages were increased from three dollars and a

half as spittoon cleaner, to five dollars a week as a Chinese doctor. He was scarcely more than a dummy—his manager, who probably never looked inside of a medical book, being the whole push in the enterprise.

It is told that the "heathen Chinee" in this combination, seeing his master raking in so much money from the business, once struck for higher wages. Whether he was pacified by a small raise, or discharged, and his place filled by some "washee man," we do not know.

But the business grew so prosperous in a little while at Denver, and so many people came from a distance to consult the great Mongolian, it occurred to the enterprising gambler to "Gun Wa" Omaha, Dallas, Salt Lake City and San Francisco. So, keeping one Gun Wa in Denver—whether the original or not, is of no moment—he hired as many other Chinamen as he needed, and it was not long until Gun Wa was everywhere, at one and the same time.

The thing was finally so overdone, the one and only Gun Wa was doing business and was personally present at so many different places and in so many different states at one and the same time, and so freely using the United States mails to further his ends, the federal authorities took the matter in hand and suppressed the omnipresent Gun Wa.

But the laws of Colorado, of Nebraska, of Texas, of Utah, and of California were impotent; and, had Gun Wa not been parceled out, as it were, and not appeared in person in so many different states synchronously, so to speak, nor infringed upon the postal laws of the United States government, he might, until now, have been holding forth in all his whilom glory, at Denver, or at any other town in any other state in this country.

It is scarcely worth while to comment further upon this case, yet one can hardly avoid some few reflections.

Think of the hundreds and thousands—and among them many of the most intelligent people from different states—who,

during the prevalence of the Gun Wa mania, thronged the offices, and would sit for hours in the reception rooms, of this almond-eyed coolie, waiting their turn to be ushered into the august presence of the so-called great Gun Wa!

Think of the multitudes of men, women and children—among them the learned jurist, the eloquent divine, the shrewd business man, the literary professor, and the woman of culture and refinement—worshipping at the professional shrine of this medical joss, conceived and born for their special regalement in the resourceful brain of the enterprising gambler.

What induced them to do it? Certainly not any real benefit ever obtained by anybody in fact, for the truth of the matter was, as is now well known, that this so-called Chinese doctor was totally ignorant of any and everything pertaining to medicine, occidental or oriental, and that the so-called medicines dispensed were nothing more than inert powders (possibly flour or talcum), variously colored, odored and flavored *a la* dried rats, pulverized toads, lizards and tumble bugs.

But though visited by thousands upon thousands during his halcyon days, and at that time in the thoughts and on the tongues of every one who had an ailment, it would be difficult now to find a baker's dozen who would acknowledge having been taken in by this egregious fraud.

But what induced them to do it? Nothing under the blue canopy of heaven but the pretended knowledge and skill of this "heathen Chinee" as promulgated through public advertisements. There is absolutely no ground, in this case, for any other conclusion. Besides, it is entirely eliminated from the field of speculation, for the more than spectacular facts are an explanation.

The degree of pretended knowledge and skill was simply unbounded, and these pretensions were made known most volubly and profusely through advertisements in the public press. Certificates of wonderful cures—miraculous cures—were obtained galore, from all classes of people, and published with a liberality

that constituted the Gun Wa enterprise a regular bonanza to the newspaper man.

It is indeed an unhealthy state of affairs when all manner of false pretenders are so facilitated in their nefarious schemes, and presents a dark picture upon the social canopy of every community, and more especially when we consider that it is done by authority, and under the protection of the laws of our land, and abetted and encouraged by the secular and religious press of the country.

Speaking of the press, and to show its comparative value as an advertising medium, we can do no better than quote from a newspaper authority the language of that able writer, Charles Hopkins Smith, of the Hartford (Conn.) *Courant,* who, in a lecture recently delivered by him on "How to Make a Newspaper," said:

"Imagine yourself agent to canvass Hartford for the sale of any article, however desirable. How are you going to get at the public? Mail them circulars, and the postmen groan and the wastbaskets in our ten thousand homes give each a weary yawn, and the circular disappears unread. Call upon people and explain the merits of your wares? How are you going to get in? The sign, 'Our Busy Day,' hangs in big letters in business offices; in private homes you must ring the bell. Oftenest you are turned away. If you get in by any shrewd excuse, you cannot get beyond the hall or reception room. You are quietly watched there in the interest of overcoats and umbrellas, and when you explain your errand you are speedily restored to the outer air. But put a cleverly worded advertisement of those same wares in a newspaper that has an established circulation in the city's homes and business houses and see what happens. You couldn't get in there yourself, but your advertisement is there on the breakfast table, in the library, in the parlor, in the sewing room, and when everybody is inquiring for the paper which can't be found, it is very likely doing duty on the quiet in the kitchen. It is all over the house and wanted there. You were not. Similarly at the office it is read and re-read, and part of the use of the 'Our Busy Day' sign is to get the chance to read the papers.

The advertisement thus started is taken right into the family life and business life."

Taking a fair survey of the whole field of quackery, there is no phase of it that is so far-reaching in its dangerous effects upon the public morals, as that branch of it that is promulgated through public advertisements.

In his multiform ways of attracting public notice, the advertising quack is peculiar. He does not scruple to resort to any scheme or method to call the public's attention to himself or his nostrums. By the flaming handbill or poster, the leaflet or pamphlet, or by aptly worded advertisements in the secular or religious press, he obtrudes himself upon the notice of everybody, and too frequently in manner and language not fit for the eyes of any decent man or woman.

But to attempt a degree of brevity in a necessarily long paper, we will content ourselves with taking up but one of the many hobbies of the advertising quacks—but one of their many chimeras of disease to catch the unwary, namely, that one so familiar to all, which they in flaring headlines refer to as "lost manhood."

Who has not read such advertisements both in the secular and religious press, and in such papers seen something of their description of the symptoms and results of "lost manhood," caused by what they claim as "self abuse," or "early indiscretions?"

The man or woman who would profess to never having seen such advertisements, I would be loath to believe had ever been in the habit of perusing the advertising columns of either the secular or religious papers. The papers which do not contain them are an exception to the rule.

Now, what is there to call this forth? Simply, that the exceptions where the youth have not committed self abuses, to a greater or less extent, are rare.

These matters, I confess, belong to the "unmentionable errors of life"—which I would more than gladly ignore in this

paper, could I do so in justice and honesty—but the importance, nay, I might say sacredness, of interests at stake, will permit of no such nicety.

It will be enough, I hope, for me to say upon this point, however, that those of the medical profession whose lines of practice constitute them the best judges, are of the opinion that self abuse is very widely practiced, in a greater or less degree by the youth of the land.

This fact the astute advertising quacks know also, and grasping the situation, they utilize it for all it may be worth to their business—not for the good of the erring, but to the unholy ends of money getting, even though they may incidentally injure —perchance ruin—their victims.

There is scarcely a person whose physiological or healthy existence has not occasional interruptions, either from dietary indiscretions, physical and mental overtax, or from exposure to unhealthy atmospheres or surroundings. The symptoms of any and all such passing indispositions are carefully described by these advertising quacks, and falsely charged to the account of self abuses, with familiar comments upon what they will lead to if the sufferer does not early seek the one and only cure—the secret remedy of the particular quack so advertising.

The young man sees these advertisements. He—in fact, everybody—has some of the symptoms described, at least at times. He begins to reflect over his "early indiscretions," and knowing himself to be thoroughly guilty, is easily led to imagine himself a sure victim of "lost manhood."

He writes to the advertising quack—most usually under an assumed name, for purposes of secrecy (for he is ashamed)—and the specially prepared literature follows. He reads the chimerical stuff that is forthcoming, and continues to brood over his condition. He compares his symptoms with those which the advertiser so cunningly describes as due to self abuses, and becomes convinced that he is thoroughly in the toils of "early indiscretions." He bodily enters the gilded parlor, so to speak,

of the professional spider, and though he does not realize it, every effort at promised relief only further entangles him in the astutely woven web of the moral aranea.

If any are doubtful of the truth of this, let them, for themselves, take up a secular or religious paper containing such advertisements, open a correspondence with the advertiser who usually promises a free treatise on the subject, follow his treatment in sham, if they like, but read all the literature which he will furnish them from time to time, and then stand forth, if they can, in denial of these statements! Rather, we opine, after such personal experiences—and that is the only fair way to investigate it—any skeptic would be ready to exclaim that the half had never been told, that the facts had been understated rather than overdrawn, and that no language or combination of languages, was sufficiently rich in descriptive adjectives to anathematise too severely the professional turpitude of these moral perverts.

Passing over any consideration of the secular press, the handbill and the poster—for these in the great majority of cases are professedly commercial in their nature—what legitimate reflection might be offered regarding the religious papers which admit such advertisements to their columns—those whose professed mission is for spiritual help, and to point out the ways of right and safety, as well as to guard against all manner of sin and consequent injury.

A short while ago I read a paragraph to the effect that a certain preacher took occasion to say that in his opinion Judas Iscariot was the meanest man that ever lived, for he had sold the Savior for a few pieces of money. At the time I could not but reflect upon how many Judas Iscariots we have among us at the beginning of the twentieth century.

Now all religious papers do not admit advertisements of such verbiage as is contained in the "lost manhood" items and their kind, but all which I have examined do admit quack advertisements to their columns, which, upon investigation, can be found to be equally fraudulent with those which appeal to sexual abuse for patronage. And too often, vaunted cures, whic[1]

are fraudulent upon their face, are not only published in the religious press, but unequivocally endorsed and highly commended by parties styled as "the Rev. Mr. So and So," who are in fact and in truth so many Judas Iscariots, or worse. The same may be said of the management of such religious papers as admit these advertisements to their columns, which the instincts of common honesty would spurn, were it not for the persuasive influence of a few pieces of money, the very incentive and temptation that induced the Judas Iscariot of A. D. 33 to sell his Savior.

If every parent in this country could be made to fully realize what they are aiding, when they admit to the family circle the average secular and religious papers of the day, they would stand aghast at their own stupidity.

Though ever so careful of the associations and indulgences of those whom God and Nature have entrusted to them; though it may be their aim and desire to guard them from contact with the nastiest of nastiness of the world—at least until mature in years—they too frequently are guilty of placing in their hands, from day to day, and week to week, enough satanic venom—only hidden by thin veneerings of a pretense at decency—to thoroughly nullify the consummation of all such parental hopes. Their studied efforts to protect their children from a precocious knowledge of the unmentionable filths of life "gang aft agley" before the daily and weekly advertisements contained in the secular and religious papers, which they admit to their family firesides.

Note the handsome boy, a noble specimen of physical promise, cheerful at all times, and able by his superior mental balance to enjoy, with apparently equal pleasure, both play and study, gradually begin to fade in his every part, to grow indifferent to play or association with his former companions; to wander from his studies, and with a book before him, to show by his facial expression, to be deeply oblivious of its contents, and languidly absorbed in mental ruminations on something which he carefully keeps to himself; and on, and on, to what? Impotency—mental, physical and sexual impotency!

Once thoroughly in the toils, it is hard to reclaim a young man from the thraldom of quackery; for, having been led by these press advertisements to clandestinely correspond with the quack doctor, is he not thoroughly convinced, at least to his own satisfaction, from the literature conveyed to him from time to time—most likely under an assumed address—that he is truly a victim of various private ills? This would be the case even though the parents ascertain the cause of their child's decline, but which they rarely, or never, do.

But it is the common experience of the regular profession to find it difficult to convince the young man who has once fallen a victim and a prey to these medical sharks, of his mistake, and dissuade him from further following them in their wily methods of maintaining their hold upon their subjects—these masters, who, by shrewdly playing upon their guilty imaginations, continue to further injure and drain them of their money.

These remarks only hint at some of the most extreme injuries wrought by the advertising quack in his unbridled efforts to entice his victims into the labyrinths of delusion for the sole and only purpose of rendering them willing and easy prey for prolonged and continuous robberies.

Hundreds and thousands of our people are there who have suffered in greater or less degree from having had to do with these moral fungi, but who, by more or less fortuitous turns in their habits and circumstances, have drifted from under the spell of these magicians of ruin before they became entirely wrecked, though they are secretly carrying a self-knowledge of blighted physical, mental and sexual existence, in greater or less degrees.

The quack whose advertisement is in the daily and weekly papers, secular and religious, which the parent placed in the hands of their own child, is, in a greater or less degree, a monster of injury to, and in some cases the utter ruin of, untold numbers of the youth of the United States of America alone. God only knows the full measure of harm that is being wrought everywhere by these multi-damnable excrescences.

One might write, or talk, upon this branch of the subject

of quackery indefinitely, for the materials for thought are boundless; but we must hasten on to some consideration of the remedies for these evils—a need which is great, and which appeals to the conscience, and should elicit the active aid of every honest man and woman in the land. If not to, and for, some remedial purpose, why study this subject at all?

We may analyze the subject *ad nauseam* and speculate upon remedies *ad infinitum,* but when resolved into its component parts, we will find that we have money and money getting on the one hand, pitted against the morals and health of the community on the other. This is the whole proposition in a nutshell.

We have upon the money getting side of this question the advertising quack, the secular and religious press, together with any and all people, in high places or low, from the ecclesiastic with a large cargo of pseudo-piety to the obscure prostitute, from United States senators and representatives and governors of the states to the hod-carrier and washerwoman of the land, who, in exchange for a little money, will give certificates laudatory of the wonderful curative powers of the various nostrums of the advertising quacks.

The scriptural aphorism that "The love of money is the root of all evil," is strikingly apt here. It is the desire for money getting that induces the advertising quack to embark in the enterprise; it is the money paid by these quacks which induces both the secular and religious press to give a space in their advertising columns to these pretenders, and it is money which buys the so-called certificates of gratitude, so pictorially published, from the high officials and so-called ministers of the Gospel of our Lord Jesus Christ down to the poor washerwomen, only, we opine, the high officials and the wolves in ecclesiastical attire receive more pieces of money than the poor washerwomen, and I am sometimes persuaded, rather more than Judas Iscariot of old.

Upon the other side of the proposition, we have the youth of the land to appeal to us for protection—our own offspring, the children of our friends and neighbors—the young men and young women throughout the length and breadth of the United

States of America, yea, of Christendom—whose health and morals are in continual menace and jeopardy from quackery, as promulgated by public advertisements.

But what of the remedy, may I again ask? That thorough and drastic legislation, to limit and control such impositions, is sadly needed in every state of the Union, is self-evident, but how to get this is the question. I was recently told by a non-medical friend that only a few years ago the physicians of the state of Massachusetts raised a campaign fund among themselves of some $20,000, for the purpose of securing needed legislation to limit quackery as practiced in that state. But what was the result? He related that when their committee on legislation arrived at the assembly halls, they were met by an opposition committee, backed with $250,000, subscribed by quackdom! Think of it! Two hundred and fifty thousand dollars against twenty thousand! But then the argument of right and justice, and good morals, and everything in the interest of truth and virtue—is this not to be reckoned along with the twenty thousand dollar fund? No, not by the average legislature, if there is a balance of two hundred and thirty thousand dollars in cold cash on the other side to offset it —not if we have a proper conception of what most influences the vote, and soothes the conscience of the ordinary politician.

Certainly it does not look hopeful to expect a people who can so easily be induced to take to "Gun Wa-ism" and other such "isms" to make themselves active in the securing of laws to suppress that which they so readily, gladly and eagerly patronize.

Nor can we expect the secular press to join in an effort to suppress one of their greatest and most profitable sources of revenue.

It would also appear hopeless, with the spirit of commercialism which seems to have infected the church, in common with all other institutions of the land, to look for aid from the religious press.

In summing up the whole catalogue of probable sources of help which suggest themselves to us, always bearing in mind

the predominant fact that the fight is between money and money-getting on the one hand, and the public health and morals on the other—especially of young persons—and carefully reviewing them all for points of vantage in a campaign of education against the cohorts of quackdom, there is nowhere that we can so safely hinge our *punc de appue* as in the hearts of the honest and educated physicians of the land.

Let every true physician feel it his duty—which it is—to take it upon himself to work actively in the cause, and by every means in his power, individually and collectively, endeavor to teach the individual patron, as well as the public, "The dangers to the public health and morals, especially to young persons, from quackery as promulgated by public advertisements."

Address.

COMMERCIAL ACTIVITIES WHICH DEPEND ON BACTERIA FOR THEIR EXISTENCE.

BY WM. C. MITCHELL, M. D.

Through all the ages, Nature has rigidly guarded from the prying eyes of man the secrets of her well-filled storehouses and her busy laboratories, but in spite of jealous care, one by one, the mysteries of her hidden Alchemy are being wrested from their concealment to become the common property of the world.

The union of science and mechanics in the perfected product of the artisan's skill, the microscope, is the moving power which has enabled man to grasp such knowledge of biology as Nature has grudgingly yielded him. This is especially true of bacteriology, that branch of biology which treats of organisms so minute that without the microscope this science hand no existence.

Bacteria are the lowest forms of vegetable life, and bacteriology is properly a branch of botany. Little wonder, then, that these microscopic beings call forth such profound and all-important changes in nature as to be absolutely essential for the reproduction of plant life. Time out of mind, man has blindly and unconsciously been using these busy agents in agriculture and in the fashioning of many of the products of commerce, but now that accurate information is being accumulated in reference to the bacteria through whose mediation certain of these phenomena occur, their use need no longer be a hap-hazard one.

Indeed, rapid strides are being made along commericial lines in the manufacture of certain of those products in which, but a short time ago, man had either unconsciously or ignorantly employed the agency of bacteria. Now, by the isolation and growth of certain species of bacteria in so-called "pure cultures," a great power is obtained with which to call forth these reactions at will and in a practically perfect manner. Especially as by simple procedures of sterilization, all extraneous germs—those foreign and injurious to the process in hand—can be absolutely excluded.

Medicine and surgery have undergone mighty revolutions in the past two decades. It is an old story that the impunity with which the surgeon of to-day handles major operations is due to his knowledge of the life-history of septic bacteria. In medicine, the conception of many diseases has been wholly transformed by the clear light of this science. With a knowledge of the causative factors of certain maladies has come an understanding as to how these diseases may be best overcome and their propagation prohibited, thus ushering in a new era of hygiene.

In reference to the bacterial diseases of both man and the domestic animals, this science has not stopped with the cause and the prevention of disease, but in many cases has carried a successful warfare even to treatment. Serum therapy and kindred methods of treatment by vaccines justly boasts of more specifics than *materia medica,* with all its advantages of age and experience. Hardly have we news from one country that a certain bacillus has been discovered as the cause of the Plague, than from another land we learn that scientists are busy transforming animals into living laboratories to that they may produce a specific remedy for the disease. Extensive capital has been invested by many private firms and corporations in the establishment of bacteriological laboratories, where the various medicinal sera and vaccines are produced, and the business interests represented by this branch of bacteriology in commerce are enormous.

The question of disease is so personal that these enterprises and the bacterial agents on which they depend are generally

known, while but little interest has been exhibited towards the already abundant knowledge of other bacterial phenomena, many of which are of more importance than the question of disease, in fact, the chief of these issues is none other than the preservation of the universal life, both animal and vegetable, of our earth.

It is well known that the animal world is dependent for its existence on plant life, and it creates no surprise that generation after generation of endless species of animals have propagated themselves through all the centuries at the expense of growing vegetation. But what of vegetation itself? Since plants are referred to the soil for all but one of the elements on which they subsist, had not even the generous lap of Mother Earth been long since exhausted of these elements? This without doubt had been the case, were it not that Nature, in the wisely ordered events of her kingdom, causes those elements which are so intricately bound up in the dead bodies of plants and animals to be reduced to their simpler forms, so that in their turn they may be used anew in the upbuilding of plant life. Bacteria are the indispensable agents which make possible this alternate cycle of food assimilation, first by animals and then by plants in endless repetition.

For a proper understanding of the mighty influence which bacteria exercise in Nature's kingdom, it is necessary to consider briefly the nutrition of plant life.

It is a curious fact that although the humus in which the roots of a plant are growing may contain a great amount of carbon, the most essential constituent of plant life, none is absorbed by the roots. It is the province of the chloraphyll bodies of the plant to supply the entire stock of this fundatmental element from the atmosphre. The incorporation of carbon results in the formation of certain organic compounds which are technically known as carbo-hydrates, substances free from nitrogen. The roots absorb the mineral substances in solution, principally the nitrates from which the plant obtains its nitrogen, and this nitrogen by union with the carbo-hydrates forms the protoplasm of the plant, which is the vital part of the organism.

Most of the carbo-hydrates go to build up the framework

of the cells, and this supply of carbon is always plentiful in the atmosphere, but the nitrogen, without which there can be no plant life, must be drawn from the soil, and, as a consequence of long-continued drains, the earth is unceasingly calling for a renewal of her supply of this element.

When the dead body of an animal falls to the ground, those bacteria whose especial function it is to carry on putrefaction, attack and dissolve into its simpler elements this complex mass of flesh. Some of the bacteria wander out from the intestines of the animal and assail the interior of the body, while others fall from the air and attack its exposed surface. In the end, no matter how complicated the tissue in the beginning, there is always formed as one of the end-products of this decomposition, ammonia. This gas, as is well known, contains nitrogen.

It now becomes the province of certain organisms, the nitrifying bacteria, which are present in the soil of all the countries of the world, to combine this nitrogen with certain elements of the soil in the form of nitrates. Thus is the chain completed. Through all the devious by-ways and complications of these intricate biological phenomena, Nature has had chiefly in view the ultimate elaboration of nitrogen from the dead body, so that it might be transformed into the nitrates, and thus be utilized as nourishment for growing vegetation. In the case of a dead tree, similar changes occur, only in the beginning certain moulds seem to be the entering wedge in attacking the dense wood of the trunk.

Abbott calls attention to the fact that the immense beds of nitre or saltpeter which are found in Chili, a country which is practically all sea-coast, are the result of bacterial action on the discharges of penguins and other sea birds. The various bacterial flora of decomposition elaborate the ammonia and the nitrifying bacteria complete the process. These beds are from a few inches to several feet in thickness, and have been found in varying strata down to a depth of thirty feet.

Century after century, these ever-active bacteria have been busy in Nature's laboratory, manufacturing and storing away this valuable product, which is now a staple article of commerce

and carried to all quarters of the globe to be used as a fertilizer.

When the farmer spreads his field with the refuse from his stables and his barnyards, he is unconsciously supplying the same conditions as are found on the Chilian sea-coast, and he is happily calling to his aid myriads of willing workers as represented by the bacteria of decomposition and nitrification.

There is one exception that all vegetation must obtain its nitrogen from the soil, and that is in the case of certain of the species of the large order of plants know as *leguminosae,* under which are included beans, peas, clover, alfalfa, etc.

For a long time botanists have been familiar with the fact that along the roots and root-hairs of these plants there are peculiar formations known as root-tubercles, but it is only recently that the astonishing role which these tubercles play in the life of the plant has been known. These nodular growths are formed by bacteria which have penetrated the tender roots of the growing plant and there made for themselves a shelter. The wonderful discovery was next made that these bacteria had the power to take up nitrogen from the atmosphere and pass it on to the plant in such a manner that its host could use it as a food.

Hellriegel has shown that these plants thrive well in a soil free from nitrogen, and that the plant body and the roots are rich in this element at the end of the season. The roots, if not the entire plant, again become part of the soil, and thus enrich it with this desirable food which the bacteria have caught up from the atmosphere. Thus has science proved what the practical farmer long has known, that a soil in which one of these species has been cultivated, the next season offers a medium most happily adapted to the needs of other forms of vegetation.

A most practical commercial use has been made of the discovery of the relation which this specific organism, the *bacillus radicocola,* bears to the nutrition of peas, beans, clover, etc.

Under the patented name of Nitragen, a well-known firm at Hochst, Germany, prepares and has for sale pure cultures of the specific bacilli for the more important of the *leguminosae.* A tube

containing four ounces and costing about sixty cents will impregnate seed sufficient for planting a little over one-half of an acre.

The directions accompanying these pure cultures as they are brought in commerce are that the contents of the tube shall be diluted in about a quart and a half of pure water, when the entire quantity is to be poured on the seeds and worked in with the mass. By this means, when the seeds are in the earth and sprouting, the bacilli are present in sufficient numbers and of just the suitable species to attack the tender roots and form the root-tubercles. Thus the plant is assured of an abundance of nitrogen, even though the soil is but poorly supplied with this important element.

Alinit is the legally protected name of a bacteriological preparation which a firm in Elberfeld has placed on the market, and its discoverer claims that it will enable the true grasses, such as wheat, oats, etc., to take up nitrogen from the atmosphere in a manner analogous to the bacterial assimilation of this element by peas, beans, etc.

The claims of Alinit are not so well established as those of Nitragen, as, according to some bacteriologists, an examination of the preparation shows that it contains more than one species of bacteria, and that its efficacy rests in the fact that these bacteria belong to the class which are especially and actively concerned in putrefaction. Any value, therefore, which this preparation possesses, is due to the fact that these agents reduce the most resistant products which are used in fertilizing, such as bits of bone, horn, hide, etc., thus adding to the strength of the soil, but that in no way do they aid the plant in the assimilation of nitrogen from the air.

Whatever the future will show to be the true status of the case in reference to Alinit, this is a valuable illustration of the energy with which this young science is reaching out to occupy territory in new fields of usefulness.

There is a well-known class of industries which depends entirely on the softening action of bacteria for their success, and these have been most aptly termed by Conn the "maceration industries." The manufacture of linen, hemp, jute and ramie are

included in this class, and linen may be taken as a type of the group.

As is well known, the fibres from which linen is made are securely cemented in the stock of the flax-stems with other wooden fibres which are not so valuable. Indeed, so firmly are the valuable and the worthless fibres bound together that every attempt at a mechanical separation of the good from the bad has failed.

The process known as "retting," by which this separation is accomplished, is a putrefaction, brought about by the action of bacteria. During this fermentation, the tissues of the plant become swollen, loosened and pliable, so that the valuable linen threads may be readily isolated.

In the flax districts of Belgium, where the finest Flemish flax is produced, recourse is always had to the river Lys to carry on this operation, and the fineness of the production is attributed largely to the action of that renowned stream, the "Golden Lys."

This famous river, known throughout the world because of its virtues in this direction, is described as "a dark and murky stream with sullen flow, its waters an indescribable greenish hue, and its odor as pronounced as its color, yet to its banks comes the flax of the entire region, * * * even by railroad trains of twenty to thirty cars." The flax, tied in bundles, is crated in boxes and sunk in the river. The bacteria in the water immediately commence the work of softening the tissues, and, as putrefaction advances, it frequently happens that enough gas is generated to cause the boxes to rise to the surface of the stream, thus giving a valuable indication to the overseer that the "retting" is nearing completion.

The specific bacillus which causes this fermentation has been isolated and studied by v. Friebes, and his investigations have shown that the "retting" is due to the power which these bacteria possess of "splitting up" or fermenting the cement, principally pectinic acid, which binds the fibres of the flax-stock together.

Although pure cultures of this bacillus are not on the market, yet a patent has recently been granted which consists of the

addition of certain substances to the water on which these bacilli thrive, and their multiplication thus aids in accomplishing the "retting."

There can be little doubt that the excellence of the river Lys in this regard is due to the permanent establishment of this species of bacteria in the water, by the continual addition to the stream of their specific food in the shape of the pectin and pectinic acid which the flax-stocks contain.

The greatest stride which bacteriology has made in commerce is along the line of dairy products. Milk which is gathered in the most cleanly manner and handled with all possible care in its transmission, contains an almost incredible number of bacteria. This is due to the excellent natural medium which milk makes for these organisms, enabling them to thrive in a manner which is truly marvelous. Milk becomes contaminated with bacteria, not only from the air and imperfectly cleaned utensils, but it has been demonstrated that the ducts of the cow's udder contain bacteria which feed and grow upon the trace of milk which this duct always contains. So that while the milk gland secretes a bacteria-free milk, in its passage through the duct, and in its contact with the air and various utensils, it receives seed sufficient for an abundant harvest. From 10,000 to 50,000 bacteria to each cubic centimetre (about 22 drops) may be taken as a fair average of the bacterial contents of pure milk as it is consumed in city life, although at times it widely exceeds this number.

The mulitplication of these bacteria often causes the most profound changes in the character of the milk. In summer, the mortality of bottle-fed infants is appalling, and this is largely due to the gastric and intestinal troubles brought about by the immense number of bacteria which this fluid contains.

As is well known, the familiar phenomenon of "souring milk" is brought about exclusively by the agency of these minute agents organisms—milk that has been sterilized may be preserved for month or years without souring. The souring of cream, which the dairyman allows to take place before he makes his butter, is brought about by these same busy agents. Heretofore,

while the dairymen have been content to allow this process to take place hap-hazardly, *i. e.,* to be accomplished by whatever bacteria happened to have impregnated the cream, now the modern dairyman avails himself of the advantages of scientific dairying.

A study of the bacteria which are found in milk has shown that there are a large number of species that are capable of causing the souring or "ripening" of cream, some of the species causing a better fermentation than others. A great number of these species have been isolated and are for sale at various laboratories in both Europe and America. The pure cultures of these bacteria, or "starters," as they are popularly called, are on the market in securely sealed vials or test-tubes, and can be readily transported great distances. There are three such laboratories in this country with which the writer is familiar—one in Boston, one in Little Falls, N. Y., and one in Philadelphia. Each of these laboratories has a large number of customers, and the use of pure cultures in dairy work is steadily growing.

Not only may one purchase species of bacteria for "ripening" cream, but there are also on the market cultures of these organisms which will give an excellent flavor to butter. Some of these cultures when inoculated into ripening cream, give the odor and taste of early grass butter, even in mid-winter when the cattle are stall-fed. Mixed cultures of the lactic ferment and of the flavor bacillus are in extensive use.

Benign bacteria are not the only kind found in milk and cream, as there are many species whose function it is to exert a harmful influence on dairy products. Certain of these species generate a bitter flavor in cream, while others antagonize the fermentation, thus giving both an unpleasantly flavored and poor quality of butter. Hence, in order to secure the greatest amount of benefit from the use of pure cultures in dairy work, all extraneous germs must be got rid of. This is accomplished by "pasteurizing" the cream, *i. e.,* subjecting it to such a degree of heat that a large number of the bacteria present are killed. This leaves the field of operation clear for the desirable bacteria, which

are then added, and these now exercise their function to the fullest extent.

Denmark is the home of the scientific dairy industry, and in no other country has such perfection been obtained in the art of butter making. England imports annually $77,000,000 worth of butter, and the largest part of it is obtained from Denmark. To give the exact figures, in 1897, England imported from Denmark alone 133,472,800 pounds of butter. There can be no better illustration than these expressive figures of the value of practical bacteriological methods. And while keeping these figures in mind, it should be remembered that the area of Denmark "is less than one-tenth the size of the State of California."

In that country an annual butter exhibition is held, to which specimens are sent from all parts of the kingdom. In 1891, only 4 per cent of the exhibits were obtained by the use of pure cultures of bacteria; in 1894, the per cent had risen to 84, and in 1898 the exhibitors using bacteriological methods registered 97 per cent.

The principal laboratories for supplying the cultures are in Copenhagen, although there are other depots throughout the country where the necessary supplies may be obtained.

To our forefathers engaged in the dairy industry it was often a matter of no moment when an individual churning failed to yield a good supply of butter, but now that the separator makes it possible to obtain cream at once from fresh milk, and since such great interests are represented in modern creameries that a day's yield of butter often amounts to several hundred pounds, the quality of the butter produced in a single day may mean either business failure or success. Denmark by the application of bacteriology to her dairy industry has shown that it is possible to obtain unvaryingly a butter of the highest quality. This important art, guided by knowledge obtained from the laboratory, has yielded many millions of dollars more to the dairyman than when, even under the best of care, the preparation of the material had to be left to the caprice of chance.

The next most important substance which is made from milk is cheese, and this product likewise thanks its existence to the benign influence of bacteria.

Cheese is made from the casein or curd of milk which has been separated by the use of rennet. This curd is pressed in different forms and placed aside to undergo certain changes. The different stages by which a fresh, tasteless, casein-mass is finally transformed into the finished product of aromatic odor and agreeable taste, owe each step of their development to the agency of bacteria. If a sterilized milk is used in the beginning, or if a disinfectant is added to the milk to prevent the development of these micro-organisms, these ripening changes will never occur and the cheese-mass remains for an indefinite time flavorless and undeveloped.

With but one or two exceptions, but little advance has been made in the use of pure cultures of bacteria in ripening cheese. In Holland, the renowned Edam cheese is made by adding a certain quantity of a sour, stringy whey to the milk from which casein is to be separated. This condition of the whey, *lange Wei,* as it is called in Flemish, is brought about by a specific bacillus isolated by Weigman and now in commerce for the purpose of generating *lange Wei.*

In some of the more piquant cheeses, such as Roquefort, Gorgonzola, or Stilton, in addition to the role played by bacteria, a certain mould is added in pure culture for the beneficial stimulus which its presence causes to the ripening process.

In making these cheeses, bread is allowed to become covered with this mould, after which the bread is dried and ground. This impregnated bread-powder is added to the cheese, and holes are made in the mass with long, fine needles, so that the moulds may receive a sufficient amount of oxygen to attain full development.

Although the manner in which the moulds are here introduced is not an exemplification of pure cultures as the term is understood in bacteriology, yet for practical purposes the method employed gives satisfactory results.

Another substance of considerable commercial importance which is manufactured at the expense of the bacteria which are found in milk is lactic acid. This drug, as we find it in commerce and medicine, has been obtained by a process of bacterial elaboration which may be described as follows: When milk sours, the lactic acid bacteria which are present convert the sugar of milk into lactic acid. This reaction, however, occurs on such a small scale that other methods are usually adopted for the production of the acid in sufficient quantities for commercial purposes. A process that is much in favor is to inoculate cane sugar with a certain proportion of ordinary cheese which is rich in lactic acid bacilli and set the mass aside in a warm place, so that the bacteria may exercise their function and produce the acid.

This industry is carried on in such a limited manner that it does not seem to warrant the care and expense which would accrue from the use of pure cultures, especially as the lactic acid bacteria which are present in the cheese are in such numbers that they practically prevent the development of the other bacteria in the sugar while their special fermentation is running its course.

The lactic acid bacteria also play an important role in the preparation of the fermented milk known as kefir. This milk-wine has long been known to the nomad tribes of Asia and within recent years has been introduced into Europe and America.

The kefir granules which are in commerce for the production of this beverage consist of dried yeast-cells and the spores of the lactic baccilli. The methods of obtaining and handling these granules excludes the possibility that this symbiosis represents pure cultures of either organism as we know them in the laboratory.

When the granules are adder to milk, the yeast-cells produce an alcoholic fermentation, which is at first mild but afterwards becomes stronger, and the bacteria generate an acid reaction. The resulting product is a sour and refreshing beverage which has considerable value as a diet for dyspeptic individuals.

Another very important role which bacteria play in commercial production is in the preparation of tobacco.

Apart from the chemical constituents of the tobacco leaf, and the richness of the soil in which the plant is cultivated, the aroma and flavor of the finished product depend in a large measure on the kinds of bacteria that are concerned in the fermentative processes to which the leaves are subjected.

Briefly, tobacco leaves are prepared as follows: The partially dried leaves are placed in small piles to undergo the so-called "sweating." During this process, by virtue of the cell-activity of the leaves, heat is generated, the albuminous constituents of the leaves are transformed, and moisture is driven off, so that the leaves are gradually dried. Another popular method of drying the leaves is to spread them on a roof.

When the leaves have been dried by either one of these processes, the next step is to expose them to a fermentation. This is accomplished by piling small bundles of tobacco together until great masses are obtained in which, under given conditions of warmth and moisture, the bacteria which are present commence an active degeneration of certain of the constituents of the leaves, the temperature of the mass, meanwhile, rising to 122° Fahr. Under the influence of this fermentation, are developed the much-prized flavors and aromas which distinguish the finer grades of tobacco.

Suchsland has isolated many of these bacteria in pure cultures and has obtained a patent from the German government for their use in tobacco fermentation. Some of the species he obtained from the finest Havana leaf, and used them on common German-grown tobacco with remarkable results. According to one writer, the flavor with which the common tobacco was invested made even connoisseurs suspect it was a high-grade imported article.

But, in spite of Suchsland's patent, and the endeavors he has made to introduce the use of pure cultures into general use, his efforts have so far made but little headway. Nevertheless, his praiseworthy efforts have added much to the knowledge of tobacco culture and point the way to a betterment of this great

industry along the same lines by which dairy products have been advanced.

Another commercial product which is largely the work of bacteria is vinegar. While chemically, acetic acid may be obtained by distillation and other methods, yet vinegar, which is a dilute acetic acid, is principally a product resulting from bacterial energy.

The oxidation of weak alcoholic solutions which results in the formation of vinegar is accomplished by the action of several species of bacteria, the chief of which is the bacillus aceti, and great masses of this organism are familiar to us all as the "mother of vinegar."

As an example of the process by which vinegar is elaborated on a small scale may be taken the production of wine-vinegar by the farmer. When the juice of the grapes has been set aside to ferment and form wine, this juice contains many different species of bacteria and yeast-cells which have obtained entrance to the liquid from the skins of the grapes, from the wine-press, the air and the hands and implements of those making the product. When this fluid is placed aside in casks to ferment, although there are numerous bacteria present, yet on account of certain of the constituents of this unfermented wine, it presents a medium in which the yeast-cells can exercise their functions to the exclusion of the activity of the bacteria present. The fermentation proceeds apace, the yeast cells splitting up the sugar into carbonic acid gas, alcohol and certain ethers which give the boquet to the wine. The carbonic acid forms a heavy layer over the surface of the wine and excludes the air. When all of the sugar present has been consumed by the yeast-cells, their work having been completed, they yield the field to other micro-organisms, which now find conditions suitable for their development. This is especially true of the bacillus of vinegar, which has been present in the liquid all along, but could not exercise its function because of the rapid multiplication and strength of the yeast-cells, and also because the layer of carbonic acid effectually kept the atmosphere from contact with the liquid. Now

the vinegar bacillus lives on alcohol, and also finds its best development in a medium to which the oxygen of the air has free access. These conditions being now present, the specific bacteria begin to grow and are soon thriving mightily, converting the wine into vinegar.

The winegrower has learned, often by said experience, when the process of fermentation has run its course, and takes the proper precaution to prevent the development of the vinegar flora in his wine.

In France, where the making of vinegar from wine has been in operation at Orleans for hundreds of years, casks are used for the fabrication of this product, which have a heavy sediment of the vinegar-forming bacteria. From time to time, wine is added to these casks and allowed to remain for a certain period, when it is drawn off as the completed product, vinegar.

The Orleans process has an extended use in many countries, but the German method of making vinegar from weak solutions of alcohol, from its cheapness, has largely crowded out the other method. Briefly, this method consists in allowing weak solutions of alcohol to slowly trickle through tall cylinders which are filled with beechwood shavings which have been impregnated with the vinegar-producing bacteria.

The use of pure cultures of bacteria has not yet found its place in the manufacture of vinegar, but it is quite apparent that the process as now conducted is one which is dependent on the hap-hazard use of several species of bacteria, and that even with the very best of care there is abundant chance for foreign and detrimental bacteria to exercise their functions at the same time with the desirable bacteria. The earnest expositions and agitations which scientists are making in favor of the introduction of pure cultures in vinegar production must sooner or later result in their commercial adoption.

There are several other products in the manufacture of which bacteria play an essential part, although pure cultures of the bacteria in question have not yet been utilized.

In the preparation of indigo bacteria assume important functions. The leaves of the plant *indigofera tinctoria* are immersed in a solution of chalk and water and allowed to undergo spontaneous fermentation. This fermentation is unquestionably caused by the bacteria on the leaves, as is shown by the fact that when the leaves are first rendered sterile no reaction occurs. As a result of this phenomenon, the indican of the leaves is split up into certain products from which is precipitated a fine blue powder, the indigo. According to LaFar, in the province of Bengal alone, $10,000,000 worth of this dye is produced annually as a result of the vitality of these busy bacteria, and 500,000 human beings obtain their daily bread by raising the plant from which this dye is fabricated.

In certain stages of another industry, the tanning of leather, bacteria are called into action to obtain desired ends.

The first step in which bacterial action is sought is in removing the hair and epidermal layer from the hide. This is brought about by placing the dried hides in a sweating chamber, where, under the influence of heat and moisture, the bacteria present on the hair and skin commence a putrefaction. This operation is allowed to proceed only so far that, as a result of the decomposition, the hair and epidermis may be easily scraped off, leaving the true skin intact. tI is this part of the hide which is to be worked up into "leather."

Another method of removing the hair is to soak the hide in a solution of slaked lime. By this procedure the pores of the unfinished leather become filled with a precipitate of lime which makes the leather brittle and also prevents the penetration of the tanning mixture to which the hide is finally subjected.

To obviate both of these evils, the skin is soaked in a solution composed of bran, coarse rye meal and the refuse of certain of the lower animals. This mixture, a so-called mordant, is active by virtue of the bacteria which it contains. These bacteria soon start a fermentation by which the carbonate of lime which has been deposited in the leather is transformed into soluble salt, thus freeing the pores of the leather and allowing both the mor-

dant and the tanning solution to exercise their functions to the best advantage.

The raw leather now swells to double its size as a result of the gas, which is developed in its interstices from the action of the ferment bacteria.

It is not beyond the range of possibility that the organisms which are especially concerned in this process may eventually be applied in pure cultures and supplant the nauseating mixture which is now in use.

In the further manipulations of this process, during which the skin is soaked in a solution of bark—the final process in tanning—bacteria are still found to be exerting their influence by generating certain acids without which the resulting leather would be sadly lacking in quality.

No mention of the part that bacteriology plays in commerce would be complete without emphasizing the great strides which have been made in the use of pure cultures of yeast-cells in the brewing of beer.

It was the genius of Pasteur which first unravelled the perplexing questions of the relation of yeast-cells to the fermentation of beer and wine, and Hansen has completed the study of these interesting organisms, until to-day the cultivation and the application of yeast-cells in pure cultures in the making of beer has been the scientific innovation that has indicated the path along which similar improvements have followed in the bacteriology of dairy and agricultural products.

Yeast-cells are not bacteria, although they are closely allied in the scale of the lower vegetable organisms, but the practical micro-biologist is as well-versed in the handling and methods of culture of the one as of the other. Some of the large Bavarian breweries have skilled micro-biologists constantly engaged in isolating and cultivating different species of yeast-cells, and it has been found that the flavor and the quality of the beer depends largely on the species of these organisms which have been employed in the fermentation. Every effort is made to prevent

the entrance of foreign yeast-cells, the so-called *wilde Hefe,* from obtaining entrance to the mixture, as their growth interferes with the proper fermentation as well as with the elaboration of a desirable flavor.

The introduction of scientific methods in the brewing of this beverage by means of pure cultures has advanced this industry to a science, and the Bavarian products, by virtue of the conscientious application of scientific principles, easily leads all other beers.

Both beer and wine are liable to serious diseases, not only during their elaboration, but also when the products have been completed. These diseases are invariably caused by bacteria or wild yeast cells, and a study of the life-history of these organisms, as revealed by bacteriology, and of the means by which they obtain entrance to the beer or wine, has resulted in the adoption of methods to exclude these unwelcome visitors and prevent their development at the expense of the legitimate hosts of these liquids.

In the first stages of the fabrication of liquor, yeast-cells as well as bacteria are absolutely essential for the successful elaboration of the product. Briefly, the biological processes which are concerned in the earlier stages of this process are as follows: The yeast-cells, which are to elaborate the fermentable elements of the grain used, are first cultivated in a solution known as sweet mash. This mixture contains many bacteria which are detrimental to the multiplication of the yeast-cells. Particularly is this true of one species which generates the acrid, disagreeable flavor with which everyone is familiar in rancid butter.

These harmful bacteria are prevented from developing by placing the mixture under such conditions that the lactic acid organisms, which are also present, are caused to rapidly multiply. The product which results from the development of these bacteria render the butyric acid organisms powerless to propagate themselves, and the yeast-cells may now develop to their fullest capacity, when they are added in great numbers to the mash which is to be fermented.

In this process, just as in the old manner of making butter, the success of the undertaking depends largely on chance. To place the operation on a stable basis, LaFar introduced the use of pure cultures of the lactic acid bacillus for the purpose of rendering the sweet mash rapidly sour. This prevents the development of bacteria which are detrimental to the yeast-cells, and these agents then develop rapidly and hold the field against all comers.

As final illustrations of the commercial employment of bacteria, we have two novel examples of the use of those organisms which are pathogenic for certain of the lower animals. Tubes of these micro-organisms are supplied by bacteriological laboratories for the purpose of exterminating certain of the lower animals which multiply so rapidly as to form veritable plagues.

In Australia the common rabbit is a public calamity because of its extreme prolificness. Lydekker, the English naturalist, is my authority for the statement that a single pair of rabbits, if placed under favorable conditions, in three years would have a progeny numbering 13,718,000. This seems beyond belief, but it should be remembered that several litters of from five to eight young are produced annually, and that the young rabibts themselves breed at the age of six months.

A certain patriotic gentleman who had not stopped to make the above calculation, imported three couples of rabbits into Australia, when the country was at the height of its prosperity. The enormous number of rabbits which soon resulted devoured the vegetation to such an extent that the condition became alarming. The sheep had no grass and the voracious rodents gnawed the bark of the young trees and destroyed the fruits and vegetables to such an extent that they threatened the very life of the colony.

A faint idea of the burden which the rabbits are to Australia and of the methods taken to subdue the plague may be gathered from the fact that the government at Victoria had erected fences of wire netting to protect parts of the country that are still free from the pests. One of these fences is over one hundred and fifty miles in length.

Pasteur proposed as a means of exterminating the rabbits that they be supplied with a food which had been inoculated with a species of bacteria which was first discovered to be the cause of cholera in chickens, but are also fatal to rabbits. The plan was to make portable barracks, fill these with desirable food which had been impregnated with pure cultures of these bacilli, and place them where the rabbits came to feed.

According to McFarland, it is estimated that two gallons of this organism grown in boullion will destroy twenty thousand rabbits.

In spite of these and other methods of extermination the rabbits manage to thrive so that millions of rabbit skins are exported from Australia annually. "In New South Wales, upwards of 15,000,000 of rabbit-skins have been exported in a single year."

A similar method of exterminating pests is the one adopted in certain parts of the Austrian Empire for the destruction of field-mice. In some of these districts, the mice create such havoc with the grain that it is more economical to allow the fields to lie idle than to attempt their cultivation. Now, by following the advice and using the cultures which emanate from the laboratory, this state of affairs may be changed.

Dr. Loffler, a well-known German scientist, while experimenting with a large number of mice in his laboratory, had most of them die with a contagious disease which he found was due to a certain species of bacteria.

So thorough was the devastation caused by these micro-organisms that Loffler saw in this species of bacteria a valuable aid to rid infected premises of destructive mice.

In trying the experiment practically, he found the method did all that could be asked of it, as he promptly succeeded in destroying all the mice on a piece of land which was so infected with these destructive agents as to be useless for agricultural purposes.

During the years 1896 and 1897, the Royal and Imperial

Veterinary Institute of Vienna distributed 250,000 cultures of these bacteria to farmers for the destruction of mice. The contents of a culture tube is diluted in a quart of water and this suffices for two thousand pieces of bread which are saturated with this mixture and then placed near the mice-holes in the field. These germs have no effect on man or on other of the lower animals.

The most recent application of bacteria for the purpose of destroying the lower animals has been made by Danysz, a student of the Pasteur Institute in Paris. A certain bacillus was isolated by him from an epidemic among harvest mice. Danysz has succeeded in increasing the virulence of this micro-organism until it will destroy the life of a rat.

The object in having a germ that would destroy rats has been especially desirable since it has been known that the Bubonic Plague is spread chiefly by these rodents.

Pure cultures of this bacillus spread in the sewers of Paris have shown the efficacy of this novel rat destroyer, and quite recently the United States Government has ordered a number of cultures to experiment with in destroying rats should the bubonic plague obtain a foothold in this country.

It would seem as if the advantages which commerce has received from bacteriology are nearly as great as those which have accrued to medicine, and that the possibilities of its extension in both medicine and commerce are beyond prediction at the present time.

Address.

TWENTIETH CENTURY SURGERY.

BY LEONARD FREEMAN, M. D., DENVER, COLO.

The executive committee has requested me to discuss the subject of "Twentieth Century Surgery," with the understanding that my remarks shall be neither too technical nor too scientific—that they shall be addressed to the laity rather than to the faculty. Hence, I trust that the physicians here will pardon me, if I dwell upon subjects with which they are already sufficiently familiar.

Believing that things present are best appreciated by contrasting them with things past, I shall speak of ancient surgery before considering that of to-day. My address, however, being limited to twenty minutes, I shall confine myself largely to the subject of amputations, using this as an illustration of surgery as a whole.

Let us imagine an amputation during the Tenth Century: While half a dozen assistants sat upon the patient and subdued his wild struggles, a surgeon, with a great knife shaped like a sickle, cut straight down through the skin and muscles of an injured leg, like slicing a sausage or a cucumber. There was no chloroform then. Chloroform is a modern luxury and was not discovered until the middle of the nineteenth century. A man in those days had to shut his eyes, dig his nails into the palms of his hands, and bear the torture as best he could. An operating room was truly a hell of anguish. No flaps of any kind were made in amputating—simply a great, gaping, bleeding wound, with the bone protruding from its center. And the

bleeding was something awful, the blood spurting from severed vessels in drenching streams. Nothing was known of stopping the circulation by constriction of the limb with a tourniquet; and it was no uncommon thing to see a poor, shrieking wretch bleed to death upon the operating table. What a memory that must have been to keep close to one during a dark night. No wonder surgeons were often afraid to operate.

As soon as the bone had been hastily divided with a saw (how a saw grates on a bone!), a red-hot iron was rubbed again and again across the raw and quivering muscles—think of the agony of it—in order to sear the open vessels and stop the terrible hemorrhage; for the art of tying arteries with ligatures of thread did not come into general use until the sixteenth century.

Instead of using a hot iron, the stump was sometimes plunged into boiling oil, melted sulphur, liquid lead, or boiling water. You could take your choice. The ancient Hindus covered the raw and bleeding part with molten pitch. Always give me an ancient Hindu for a cheerful idea.

Such was the fear of hemorrhage that many ingenious expedients were employed to control it. A favorite remedy among learned men was to hold a toad in the hand until the animal became warm. But toads have an unreasonable tendency to remain cold, so the advocates of this attractive method had always an excuse ready in case the patient failed to receive that benefit which he had a right to expect. It was claimed in support of this theory that if a toad were hung about the neck of a rooster for a day or two, the head of that rooster could be cut off without the loss of a drop of blood. Roosters are different now.

Another method was to thrust the bleeding part into the vitals of a live hen. But while the surgeon was out in the yard chasing the hen, most patients would bleed to death.

The moss that grows within dead men's skulls was a favorite, if somewhat gruesome application. If they had used the moss that grew upon their surgeons' backs, there would have been less trouble in obtaining it, and the results might have been just as good.

Various mysterious powders and liquids were employed, which were efficacious as so much sand, but which were nevertheless bought for fabulous sums, occasionally by kings and princes. Some of these powders were so potent that they would even prevent hemorrhage when applied to the weapon which produced the wound. All the timid duelist had to do was to get a little powder secretly smeared upon his antagonist's sword, and the results after that might take care of themselves.

We cannot wonder that a reaction set in, many surgeons becoming afraid to amputate at all. Limbs were no longer cut off, but were permitted to rot off, during months of fever and suffering. Other operators amputated with red-hot knives, while some past-masters in the arts of torture used wooden or ivory knives dipped repeatedly in nitric acid.

The more quickly a leg was removed, the sooner could bleeding be controlled, hence a pious man invented a machine resembling a guillotine, in which the limb was placed on the edge of a knife-blade, while a second knife, heavily weighted, fell upon it from a considerable height. Bones were, of course, terribly splintered, but no one seemed to pay much attention to a few splinters. What a delightful time the victim must have had waiting for the knife to fall.

Another eminent practitioner of the gentle art of surgery tied a cord about the seat of amputation, and, by means of a stick, slowly twisted that cord tighter and tighter during the course of several abnormally long days, until the leg was twisted off. That surgeon is now shoveling sulphur in the warmest corner of purgatory.

Those who calmly chopped off legs with a meat-ax were not so cruel after all, considering the performances of their brothers in iniquity; but there is no excuse for the villains who used a chisel and mallet, cutting slowly through flesh and bone as though doing a job of carpentering.

As late as the middle of the present century, a Parisian surgeon first fractured the bones of his patients' limbs and then twisted off the rest of the tissues with a wire rope. A pity such

men must die. They should live forever and enrich the world with their valuable discoveries.

It is strange that surgery made so little progress for centuries—from the time of the Roman Empire to within two or three hundreds years of the present date. Throughout those dark ages of medicine many surgeons feared to amputate through living tissues, but first permitted injured extermities to become foul and gangrenous, and then cut them off through the dead parts. This was the only procedure followed during the time of Hippocrates. Hemorrhage was avoided with certainty, even though the patient died.

Under these old methods it required from six to eighteen months to recover, during which dreary eternity the end of the bone, which always protruded from the open wound, had to exfoliate and drop off. As an aid to this process the bone was repeatedly burned with a red-hot iron. This kept the patient in good heart, and made him realize that something was being done. Even if the sufferer was unlucky enough to recover, which seldom happened, his stump was covered by a tender and delicate scar which was always ulcerating and giving rise to pain and annoyance.

When the tourniquet came into general use and the fear of hemorrhage was lost, amputation experienced a boom—everybody wanted to amputate, and everybody amputated. A surgeon's reputation was largely measured by the number of mutilated cripples hobbling in his wake. If a man hurt his leg at all severely, that was the end of that leg. Amputations were made even for simple fractures. The craze, however, soon subsided, and the present rule became firmly established—to save whenever saving is possible.

Not so very many decades ago, to enter a hospital was almost equivalent to entering the jaws of death. Gangrene, erysipelas and blood poisoning stalked unhindered through the overcrowded and poorly ventilated wards. So prevalent became the most horrible and hopeless forms of wound-disease that the hospitals of Paris and Vienna were formally closed, and patients

housed in tents in the open fields. The fear of hospitals which still exists in the minds of many probably dates largely from this period.

Nothing was known of surgical cleanliness until some thirty-five years ago when Lister, of London, announced his momentous discoveries. Suppuration was regarded as not only unavoidable, but desirable and even necessary. Surgeons were never satisfied until good "laudable" pus had been obtained; and the relations between fever, blood-poisoning and suppuration were unrecognized or disregarded.

To have a leg amputated, even in the twentieth century, is not a luxury, nor a thing to be strongly desired; but it is not the horrible, blood-curdling experience now that it once was. Some wet morning, for instance, when you least expect it, you slip and fall in front of a trolley car on the corner of Seventeenth and Curtis. You find yourself on your back in the street, your leg crushed below the knee, skin the color of white wax, and clothes muddy and torn. After a wild ride in the ambulance, with swinging slides around the corners, and painful jolts over the car tracks, you reach the hospital. A hypodermic of morphine is given, and in a few minutes you are perfectly easy and free from pain; although weak, pale and bloody. A surgeon examines your injured extremity. The skin is burst open, exposing the lacerated muscles and splintered bones. The circulation is destroyed, and the whole dreadful wound is smeared full of the dirt of the street. An amputation is necessary. Before you fully grasp the horror of your position, for the mind is hazy at such times, chloroform is administered ———, and then you find yourself back in bed, gazing at a sweet young woman in a white cap and spotless apron, and trying to realize that your wounded leg is no longer attached to your body. When the effects of the anæsthetic have worn off, you are quite comfortable, and in two or three weeks you are well and about on crutches. From the time you entered the hospital there was practically no pain, no fever, and comparatively little discomfort.

Some years ago 222 major amputations were reported from the Heidelburg Clinic, 200 of them progressing in this emi-

nently satisfactory manner; and the results are even more brilliant to-day. .

The achievements and possibilities of twentieth century surgery are so well known that I am tempted to rest my case here; for even the uninitiated must appreciate the contrast between the old and the new, without further elucidation.

Our present superiority, however, does not depend, as some believe, upon greater skill in the use of the knife; for our more recent ancestors could operate just as skilfully as we do, and some of them even outclassed us in dexterity. But the brilliant success of modern surgery rests upon improvements in hospitals and in nursing; upon surgical cleanliness and a knowledge of bacteriology; and upon advancement in methods of diagnosis with the resulting increase of "surgical judgment."

The fear of hospitals has largely disappeared, and people are so rapidly learning to regard them as havens of comfort and safety, that the numerous institutions can scarcely find room for those who are constantly applying for admission. Cleanliness, neatness and cheerfulness reign where formerly existed dirt, contagion and despair.

The trained nurse has added much more to the comfort and safety of operative procedures than is perhaps generally appreciated. Our palatial operating rooms, with their plate glass and polished marble, would be but foolish pretense without the intelligent supervision of a well-trained nurse.

Diagnosis has advanced with gigantic strides within the last few years. To be able to recognize a disease with certainty, and to recognize it promptly, is of the utmost importance, perhaps involving the life of the patient. Microscopic examinations of the blood often enable us to detect deep-seated suppurations and to distinguish one disease from another; they may even tell us whether the individual is strong enought to bear an operation. From laboratory study of the bodily excretions and secretions, the pathological secrets of the internal organs are exposed; and even the most ignorant are familiar with the wonderful possibilities of the Roentgen rays. All accessible cavities of the body, even the

stomach, may be explored by means of mirrors and electric lights, and operations performed within them which could scarcely have been imagined by the older surgeons. Experience has taught us that various diseased portions of the body can be removed with benefit—not only arms and legs, but kidneys, bladders, spleens and even stomachs. It is no uncommon thing for surgeons to take out a section of intestine, a portion of the liver, or even a part of the lung or brain.

However important other things may seem, bacteriology is really the hub around which the spokes of twentieth century surgery revolve. Without the foundation of bacteriology, and the knowledge of surgical cleanliness which it involves, the entire superstructure of modern surgery would tumble into fragments. Bacteriology is sometimes spoken of as a theory. It is not a theory. It is a science, the facts of which are as absolutely demonstrated as those of chemistry or physics. When we find certain bacteria always present in inflamed wounds, when we can cultivate them on gelatine in pure cultures through many generations, and then inoculate them into animals and produce the same sort of inflammation containing the same germs—when we can do these things as often as we please, we are dealing with facts and not with theory—facts which are practically supported by brilliantly successful surgery.

The art of surgical cleanliness, which means the exclusion of germs from wounds, has added largely to the sum total of human happiness and longevity. Much physical suffering, which was formerly endured with what fortitude we could command, is now dissipated by a few painless strokes of the knife, and with a minimum amount of danger and discomfort. Especially should women be thankful for the blessings which have been conferred upon them.

The twentieth century has opened most propitiously as far as surgery is concerned, and the horizon is replete with suggestions of further discoveries and improvements. And one of the greatest advances will be an increase in our knowledge of what to do and what not to do—a clarification, as it were, of the surgical atmosphere.

Address.

MEDICINE IN EGYPT, PAST AND PRESENT, WITH STEREOPTICON VIEWS.

BY R. W. CORWIN, M. D., PUEBLO, COLO.

Where the cradle of civilization was rocked, we are in doubt—whether in the delta of the Nile, or farther to the East, history is unable to decide. To us this evening, it matters little, for we are convinced that the early Egyptians were among the first, if not the first, to give birth to the science of medicine, if this term may be applied at this early period, and that they have given us a history more complete and connected than any other nation. "If the physician looks up the dawn of his favorite science, he will find it in Egypt."

They made their records upon stone, clay and papyrus, which has proved more enduring than anything in use by us for a similar purpose. With all our boasted intelligence and inventive shrewdness, we are told that our books would have crumbled and our ink faded long ere this; that not a page of print or scratch of pen now in existence will last a twentieth part of the period of the tablets inscribed by the builders of the great temples and mighty pyramids of the Nile.

The lower animals no doubt taught the savage in his primitive state; they are still teaching us. The animal is patient; the human being dull of comprehension. For thousands of years the cat utilized dry dust as a disinfectant right under our noses, yet we could not comprehend. The sick or wounded animal seeks rest, bathes its wounds, refuses food, and often resorts to herbs. Early man undoubtedly took advantage of brute instinct; later, reason asserted itself, and man applied his skill.

Although imperfect, we have a history of the Egyptians from extreme antiquity down to the present day, and from it we learn that these people were progressive; often meeting with obstacles and reverses, but advanced up to a comparatively recent date, and kept in the lead of all other nations, who borrowed freely.

From the first dynasty to the destruction of the schools at Alexandria, medical science among sciences stood second only to engineering in the Land of the Pharaohs. Finally, darkness overtook this nation, as it does all who transgress the laws of Nature and God, and for a time it lay dormant, and the black arts were practiced in a most depraved manner.

A few generations ago, they were visited by those nations whom they had taught, and to-day are receiving the bread they cast upon the waters centuries ago.

At the very dawn of the world's history, medicine was given a place to be envied—a place beside the gods and rulers. If the position of the doctor be questioned to-day, there was a time when he occupied a station beyond dispute. He may never again be so appreciated, but once he mingled with gods, and was no less than a little god himself.

Chnemu, the god and physician of the Upper Nile, put together the scattered limbs of the dead body of Osiris. On the beautiful temples at Philæ, he is represented making man out of clay on a potter's wheel.

Osiris married his one sister, which established the custom among the Egyptian and Grecian Ptolemies. Isis, goddess of Philæ, demonstrated her eminent medical skill by recalling to life her son, Horus.

Imhotep, the Egyptian Aesculapius, whose temple stood at Memphis, and Chunsu, the counsellor of the sick, are often mentioned, but were of lower rank.

Thot, a god represented with the head of an ibis, or a dog, enjoyed great respect as inventor of art in general, and especially of the healing art, and Thot is supposed to have been the author of the oldest Egyptian medical works, whose contents were first engraved upon pillars of stone, and subsequently formed part of the so-called "Hermatic Books."

The cat-headed Pacht exerted such influence over parturient women, that the cat was made sacred to this goddess, and the killing of a common, nasty, lemon-colored cat was punished by death. To-day tons of mummy cats are being exhumed, having been preserved thousands of years with great care and ceremony.

The gods were worshipped through the priests or doctors. In the early period of Egypt's existence, we are led to believe the doctor played a most important part as the representative of the gods, and perhaps he may be pardoned for having felt at times that he was a little deity. But even then he was more modest than some healers of the twentieth century, who claim to be a large part of God, if not the whole thing.

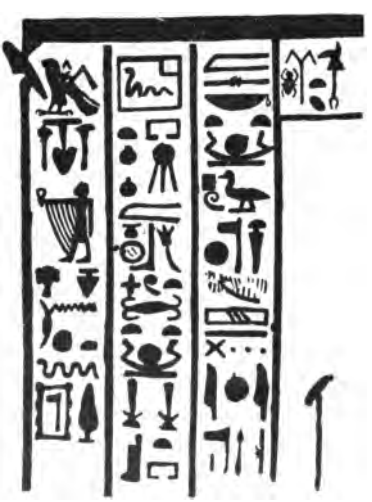
Each city and place had its gods; each god, its doctors. People moving from place to place took their little gods and their great gods with them. This confused matters and multiplied the places of worship and the number of doctors. So great and rapid became the confusion and multiplication that a reaction was created and a change was found necessary. The number of gods made it difficult for the people to get around to pay their respects; the numerous places of worship became expensive, and the offerings burdensome. The enormity of this tax may be appreciated by the following, which it is said Rameses III contributed during his reign of thirty-one years:

169	towns,
113,433	slaves,
514,000	head of cattle,
680,000	geese,
500,000	fish,
2,382,000	fruits,
6,744,000	loaves of bread,
256,000	jars of wine,
5,740,000	sacks of corn,
466,000	jars of beer,
2,250,000	jars of incense, honey and oil,
178	ships,
514	vineyards and gardens of trees,
1,071,780	plots of arable grounds,
1,091,803	valuable stones,

besides immense fortunes of gold, silver, bronze and precious stones.

It was clear that the number of gods must be curtailed, the places of worship made fewer and expenses reduced. All this necessarily affected the doctors. There was but one way—namely, consolidation—and an amalgamation of divinities was instituted. A trust of, if not in, gods was formed. This is one better than Mr. Morgan has proposed, but there is no telling what he may have in mind.

In the early days of Egypt, patients were sent to the temples for treatment if able to move or be moved, or sat beside the road where they might be seen and prescribed for by those who had had similar ills. When a priest doctor was called to the bedside of the sick, his only hope of curing the patient was through prayer. In those days it required no thought or knowledge to be a doctor, no experience was of service, no scientific investigation desired; dissection was considered unholy; vivisection criminal—even the undertaker who made the incision for disemboweling for embalming was mockingly whipped, stoned and chased. Prayer and faith were the "All-in-all;" incantations, the only possible means of cure. These ignorant, superstitious



PART OF EBERS' PAPYRUS.

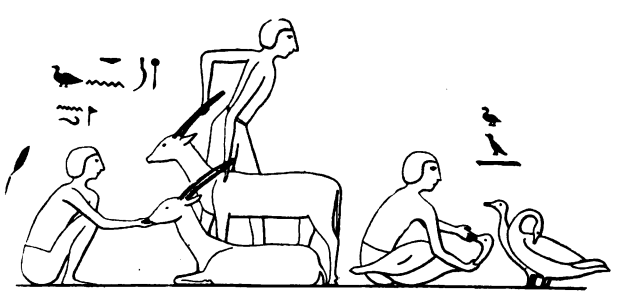
DR. SEKHET ENUANCH AND WIFE—SAKKARAH.

healers depended entirely upon mental impression. If the malady was slight or the endurance of the patient great, the prayer healer got the credit of effecting a cure. If the patient died (although

in that day it was claimed there was no death,) evil influence, stronger than the power of the gods, predominated, and the prayer of this self-appointed, ignorant priest, doctor or healer, like those of the sinner of the present time, availed nothing. The world still moves in cycles.

If you will go to Sakkarah, some twenty miles from Cairo, and search among the step pyramids, you will find a small and unostentatious tomb, but one of deep interest to any physician. It is the tomb of Dr. Sek-het-enuanch. Dr. Sek-het-enuanch was the chief physician to the Pharaoh Sakura, who lived about 3133 B. C., and the first physician of whom we have authentic record. I have the honor of presenting to you a likeness of the doctor and his good wife, as they are represented upon their tomb. The doctor carries two scepters, the emblems of power and rule, which were alone for the highest dignitaries. He wears a panther's skin, which formed a part of the dress for a noble. The wife, who appears three times on the tomb, in each case wears the universal Egyptian woman's dress. Its colors show it to be gaudy, but the pattern scant.

The inscription on the tomb states that the doctor healed the nostrils of Pharaoh, and, as a reward, the king gave him two limestone slabs, which the temple masons inscribed.



MEDICATING GEESE AND DEER.—WILKINSON.

The next important find was the discovery of Ebers' Papyrus, the oldest authentic history of medicine extant. The British Museum Medical Papyrus, which is believed to have been written in 1100 B. C., it is said, contains little of importance. The Berlin Museum or Bougsch Papyrus, bearing dates of the 14th century B. C., contains 178 medical receipts; but neither

of these compares with Ebers' Papyrus. This papyrus bears the date of the 16th century B. C., and was one of the most important discoveries of the 19th century. It may not be out of place for us, in this connection, to refer at some length to this medical work—the first *scientific* medical book published, as far as we know.

Georg Ebers in 1872 visited Egypt, and went to Luxor, which is 600 miles from Alexandria. Luxor is near old Karnak, and one of the most important places on the Nile. On the east side of the river miles of ruins still bear witness to the magnitude of this wonderful city. Just across the river is its Necropolis, or City of the Dead. With great ceremony and pomp, the deceased and friends were transported in boats across the Nile, and the departed one, properly embalmed and richly encased, was placed in a tomb in the hills of Biban el-muluk. It was among the tombs of the kings at this place the body of Rameses was exhumed but a few years ago.

While in Luxor, Prof. Ebers met an Arab who gave him a roll of papyrus, which it was stated had been found twenty-four years before, along with the bone of a mummy in a tomb of the Theban Necropolis, which is some miles further down the Nile.

This papyrus, which was 20 meters long, or 66 2-3 feet, and a little less than a foot wide, divided into 110 pages, contains many miraculous statements regarding medicine. The calendar, as deciphered, proves this medical work to have been written in 1552 B. C., thirty-five centuries ago. This was prior to the Exodus of the Israelites; Moses had just reached his majority. The following are the heads of chapters:

1. Of the preparation of medicines.
24. Of salves for removing the uhan.
47. Catalogue of the various uses of the teguem tree.
48. Medicines for alleviating the accumulation of urine and diseases of the abdomen.
55. The book of the eyes.
65. Medicaments for preventing the hair turning gray and for the treatment of the hair.
66. Medicines for forcing the growth of the hair.
79. Salves for strengthening the nerves and medicines for healing the nerves.

85. Medicines for curing diseases of the tongue.
89. Medicines for the removal of lice and fleas.
91. Medicines for the ears hard of hearing.
99. The secret book of the physicians. The science of the beating of the heart and the knowledge of the heart as taught by the priestly physician Nebsecht.

At this late period the science of medicine, although yet in its infancy, had made much improvement. The relics of the priest doctors appeared here and there in print, as may be judged from the following:

"The book begins with the preparation of the medicines for all portions of the body of a patient. I came from Heliopolis with the Great Ones from Het-aat, the Lords of Protection, the Masters of Eternity and Salvation. I came from Sais with the Mother Goddesses, who extended to me protection. The Lord of the Universe told me how to free the Gods from all murderous diseases."

But the incantations were mere forms, and used as a matter of habit, not superstitiously as in former years, nor as relics of former barbarism, as in the present twentieth enlightened century. Rameses III punished with death the sorcerer and magic healer. It is fortunate for some that Rameses III did not reign thirty-five centuries later.

The illustrations before you give a good idea of some of the prescriptions found in Ebers' Papyrus. Space was left for marginal notes, and here the learned recorded their experiences. In some of these spaces were found such expressions regarding prescriptions as "good," "this is a genuine remedy," "excellent," "I have often made it and also proved it."

The doctor in those days, however, had little opportunity for original investigation, and it is claimed that the attending physician was made to follow his patient into the spirit world if the latter chanced to die after taking a prescription not found in the regularly prescribed books.

It is thought by some that the Egyptians went very extensively into specialties, that physicians confined themselves very closely to a single class of cases. It is known that there were those who gave their whole attention to the eye, probably

for the reason that there are those who do the same to-day in Egypt, i. e., on account of prevalence of eye diseases.

Diseases of the stomach, abdomen, and urinary bladder received much attention, as well as the nose, ear, and ulcers. The bowels undoubtedly gave the early Egyptians much trouble, and no doubt the appendix commenced on its miserable mission thousands of years ago. Ebers' Papyrus says, "When thou findest a man with an obstruction, his heart hot and his belly swelled, that is an inflammation that cometh from irritant food," or "when the stomach moves to and fro under the fingers like oil in a bag," or "when hot and swelled," or "when the patient vomits and feels very ill," the trouble was placed under one of four heads of abdominal obstruction. The general remedy was enemata.

The Egyptians paid less attention to prognosis then than did the Greeks, but here is an exception: "If a new born baby cries 'Ny' he will live; if 'Ba' he will die."

For soothing a crying baby a mixture of fly dung and the seeds of the plant schepen was recommended. Schepen was probably our poppy. Here is a prescription against witchcraft: "A beetle—cut off his head and wings; boil him and put him in oil, and apply to the part. Then cook his head and wings, put them in serpent's fat; warm it, and let the patient drink it."

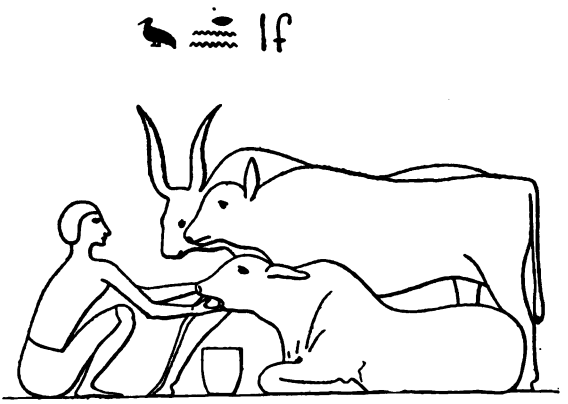
Here are two household prescriptions: "To keep away mice, smear everything possible with cat's fat."

"To prevent the hefa snake from coming out of his hole, put a dried aut fish, or soda, or an onion on it; he will not come out." Who could blame him?

Pills, potions, plasters, inunctions and inhalations were used. The last chapter of the papyrus treats of tumors, and recommends that they be tested with the finger, and generally operated; but there was one kind which became covered with pustules, and caused sharp pain—they advise no interference. This they called the tumor of the god Chensu.

Considerable attention was paid to gynecology. On page 170 prolapsus of the uterus is mentioned thus, "A remedy to enable the uterus of a woman to return to its proper region." The remedies are, "Honey and petroleum," applied locally with

finger, and the uterus pressed into place. Also the fumes of wax and hot charcoal were recommended to be allowed to penetrate the uterine cavity. Page 171—a receipt is given to enable a woman to give birth to a child, and on the next page, abortion is apparently alluded to.



MEDICATING COW.—WILKINSON.

Also remedies for corrosion of the vulva, producing round pustule in the vagina; a remedy to prevent disease starting in the labia, and against shooting pains in the vagina; to prevent inflammation of uterus, which consisted of an astringent wash of palm fruit and cypress blended with oil.

"When fluid escaping from the vulva is like water"—a medicated linen pessary was introduced into the vagina and left for four days.

Vaginal suppositories were used. Vaginal and rectal injections resorted to, and fumigation not unknown.

Labor seems to have been entirely in the hands of midwives. Prostitution existed, and evidently gonorrhœa was common, proven by passages from Leviticus and Deuteronomy; and as McKay says, "It follows naturally that Bartholinian gland abscesses existed, as also did vaginitis, endometritis, salpingitis and pro-salpinx." Hemorrhage was controlled by cautery.

In anatomy, the Egyptians were deficient, but further advanced than any other nation of their time, due to their experience in embalming the dead.

Withington writes, "Clement of Alexandria maintained that the Egyptian knowledge was contained in forty-two sacred books, the last six being medical and treating of diseases, anatomy, drugs, instruments, affections of the eye, and women." Prof. Ebers thinks his papyrus is the book on drugs, but its translation shows that it deals with other things than simply drugs, and appears to be a compilation from many authors, rather than a sacred book.

Boas' History of Medicine says: "An oculist from Phœnicia was one of the associate authors of the book. It was probably written at Heliopolis under King Ba-Kerh-va."

Not only was man treated, but lower animals as well, as may be seen from the following illustrations. (See notes.)

It is a question how extensively surgery was used before the Alexandrian period. Between the time of the writing of Ebers' Papyrus and the establishment of the Greeks in Egypt, the Egyptians retrograded and resorted to sacerdotal offerings and superstition. There seems to be a period of darkness, like that which possibly is threatening our people to-day. Was the exhibition witnessed in Chicago, but a few days ago, of a burned woman and child, whose friends, father and husband denied her rational assistance, anything less than a sacerdotal offering? A burned woman placed upon a bed or altar, around which gathered a number of ignorant, superstitious inhuman beings, asking their gods to appease suffering and heal and restore burned tissue?

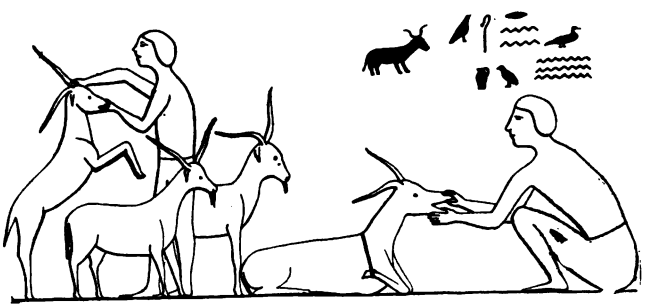
Or the woman who died in childbirth in the presence of this class of fanatics, and could have been relieved by a light operation, according to the testimony of the physicians who afterward examined the body?

It is said that there are a million people in the United States who are desirous of plunging this country into the depths of darkness and degradation of the Egyptians of the 25th dynasty. If the adults alone suffered, we should feel less inclined to enter protest, but why should we in the 20th century return to the slaughter of the innocents of Moses' day?

B. C. 332 Alexander the Great invaded Egypt. While this powerful general respected the religion and customs of the people,

the more progressive and enlightened Greeks established their habits and methods among the conquered, and soon very largely superseded those of the Egyptians. From this time on, the history of the practice of medicine was that of the Greeks rather than of the natives.

Were we to introduce the Alexandrian school in this connection, we should be obliged to present the name of Alexander



DOCTORING GOATS.—WILKINSON.

the Great, who founded the remarkable library and schools in the city bearing his name.

Also of Ptolemy II, who added six to seven hundred thousand volumes to the library, and took an active part in the study of anatomy, and the dissection of human bodies, which under his reign "was allowed and recommended;" "Although the prejudice of Egyptians," says Parks, "was very strong against those who touched a dead body, the Ptolemies themselves are said to have participated in this kind of anatomical study, thus destroying by their example the odium previously attached to dissection."

Neither could we omit the name of Aesculapius, who is represented with serpent and staff, and "was the leading character in medicine of all the ancients, with the possible exception of Hermes among the Egyptians." The picture I here present is from a marble statue in the Louvre.

The father of medicine, Hippocrates, whose learning greatly influenced the adopted school of Egypt, would also figure extensively in this connection.

As a student of Alexandria, Claudius Galen, the great anatomist, occupied a high position. The list of those connected with this seat of learning, and who directly and indirectly influenced the medical world at this time, is too long for us to review this evening; and not especially does it concern us; for only indirectly were they associated with the work of the Egyptians.

The world will never know how much richer would have been our knowledge in Egyptian and Grecian medical literature, had Caliph Omar been of a medical turn of mind and found other fuel for his 4,000 baths which he heated for six months with the unique collections of the Alexandrian Library.

We shall now pass to present Egypt. In a word, let it be said that through the energies of the English, French and German, who are well established in that portion of the Sultan's empire, medicine and surgery is not behind any country in Europe or America. The land is small, the people not numerous, and the schools few, but the institutions in Cairo, the seat of learning in Egypt, are well equipped and do most excellent work.

The Medical College in Cairo, under Dr. Keating, is worthy of a position among good schools, and is especially proud, and has good reason to be, of its Pathological Laboratory. Egypt is an exceptionally rich field for the pathologist, and not a few have been the additions made to the scientific world from this source.

Hospital advantages in Cairo are excellent, considering the size of the city and Turkish progressiveness. Egypt seems to be well supplied with physicians, and their intelligence compares favorably with those of our own country.

There are many foreign doctors, and undoubtedly a large number have located there on account of their health. Colorado can appreciate this condition of affairs.

Outside of Cairo and Alexandria, the cities are small, and I imagine the opportunities for a physician getting rich are not great; one having, however, the true spirit of our profession would have no excuse for failing in his mission, for his practice could easily be made extensive among the poor, who are always there.

The climate of Egypt has long attracted attention. The Romans appreciated it, and people from all over the world are still flocking there during the winter months. Last year Cairo claimed over 7,000 visitors, and it is stated more than half were from America. I must admit, statements found in guide books and medical works regarding climate, have little meaning for me. I perhaps have lived too long in Colorado, but when I read in Baedeker "The blue, cloudless sky, the powerful sunlight, and the dry, warm air are among the first facts that strike the traveler on his arrival in Egypt, and his surprise increases when he ob-

SOCIETY WOMAN NEEDING TREATMENT.—WILKINSON—THEBES.

serves that the conditions remain uniform day after day, and are in short, so entirely the rule that the weather ceases to be a topic of conversation," I had a feeling of pleasure and hope. Anything to get away from the rains of the Mediterranean and the humidity of Southern Italy. Imagine my disappointment to find Alexandria drenched, and Cairo hub deep in mud. The climate of Cairo has its drawbacks. The overflowing of the banks of the Nile and general irrigation have all the disagreeable features that necessarily accompany such conditions. The days are hot, and the nights uncomfortably cool; and when I further read in Baedeker, "Cairo cannot properly be considered a health resort," my confidence was in a degree restored.

The City of Cairo is very attractive; there are plenty of strange sights and curious noises; its people are always dressed for a masquerade, and the street scenes are as varied as those of a kaleidoscope. If the health-seeker needs but recreation, no city

can compare with Cairo for a cure. Its hotels are of the best and most expensive. The shops are bits of World's Fairs constantly on exhibition; the filth and squalor in some portions of the place are beyond description, and the odors can rival those of Cologne or the City of Mexico.

Diseases common to other countries are found in Egypt, and some are commonly common. Venereal diseases are very prevalent among the natives.

One physician, who has lived in Egypt forty years, told me nearly every family was tainted with this plague, and so generally known was it that patients coming to the physician's office, unhesitatingly and unblushingly admitted it when asked.

The death rate among children is frightful. "It is not unusual to find parents childless, but rare to find children without parents," said a missionary of fifty years' experience in this land. Why? The cause is above stated.

FLIES INFECTING EYES OF CHILD—LUXOR, NILE.

All know of the fly plague of Egypt, and the prevalence of conjunctivitis.

At first I was astonished to find so many people affected with diseases of the eye, but when I saw the care parents gave

their children, I was surprised to discover any natives who could see.

This photograph but partially illustrates the condition and neglect. I have seen the face of a living babe so covered with flies that it was impossible to tell the color of the skin, and the attendant, mother or older sister, perfectly indifferent, and the babe apparently oblivious.

I said to Dr. Lansing, an oculist of Cairo, who had lived among the natives nearly a half century: "What is the cause of so much eye trouble?" "Flies, largely," was the answer. "Why do not the people brush the insect from their faces? Is it true they consider them superstitiously?" "Not at all; they do not feel them," replied the doctor. Continuing, he said: "Let me prove to you how much less sensitive these people are than many you know. See, I apply pure nitrate of silver to these lids, and they open their eyes at once, and there is no pain or distress. You would suffer for hours if thus treated."

The Pathological Laboratory of the Cairo Medical School is an interesting place. Here, many strange and new parasites are found and exhibited. On my way through the Chemical Laboratory, a long row of large glass retainers was observed. "They contain stomachs, etc., just brought in for examination," said Dr. Keating, the superintendent of the schools. "We are obliged to make many examinations for legal purposes. It is the old story, one wife jealous of another or another's child, sudden death, examination of stomach."

Tuberculosis is said not to be prevalent. Most of the cases observed come from the mountain regions of the Upper Nile seeking the lower altitudes and milder climate of Egypt.

Other pulmonary affections are not uncommon, however. Two of our party contracted pneumonia while on the Nile, one dying at Jerusalem; the other recovering after a severe illness at Assuan.

Egypt, like Colorado, has many climates. The atmosphere near the sea is very different from that of rainless Assuan.

Egypt has its drawbacks, and one may not expect benefit if suffering from "advanced organic heart diseases, or locomotor ataxia, which is affected by the electrical conditions incident to

the atmosphere of the desert," or some forms of skin disease and insomnia and neurosis irritated by the brilliant sunshine; but for most pulmonary diseases, Egypt is almost ideal. The combination of climate and subjects of interest cannot be surpassed. One may sleep in the open air, and seek recreation among historic ruins; sail on the Nile or visit pyramids by camel's back. A view of an Egyptian sunset would almost vivify a mummy, and true is the Arab proverb, "He who has once tasted the water of the Nile, longs for it inexpressibly forevermore."

THE RELATION OF OUTDOOR LIFE TO HIGH ALTITUDE THERAPY.

BY CHARLES DENISON, M. D., DENVER, COLO.

By the consideration of this subject it is hoped to answer a question proposed for solution, namely, Do unhygienic conditions in high and low altitudes differently affect the susceptibility of persons to tubercular infection?

If the pure dry air of Colorado is good for anything, it is certainly so out in the open and not in confined space.

Eliminate the factors—ample space and sunshine—and no one, that I know of, claims superiority for the climate of Colorado, for such a claim can not be successfully maintained. The disadvantage due to the loss of oxygen in a *confined* space, will more than counterbalance any good mechanical effect of lessened atmospheric pressure upon the blood circulation or upon the respiratory organs.

Outdoor life, then, is the essential condition of benefit. I propose to show not only its increased advantage through altitude, but that this enhancement comes through attributes or effects which act oppositely upon unhygienic conditions when these, as is usually the case, are associated with confined space. That is, the good results of outdoor life and the bad results of

deficient ventilation are both increased by altitude. The prominence thus given to *outdoor life* and to *deficient ventilation* is perfectly apparent. For lack of time to here consider the proof of this, I shall have to refer to my paper on "Degenerative Results of Deficient Ventilation."* The importance of these two cardinal points is, however, generally admitted, though insufficiently appreciated. Then we ask—

1st. How does it happen that life out of doors is enhanced by altitude? The answer is through its perfection in quality and its facility in use. All the attributes which go to make up the weather are favored by a rightly chosen altitude. A choice must be made, for we have no intention of defending the extremes, either in Alaska, under the equator, or in Colorado. If the locality is appropriate the dryness of the atmosphere is likewise characteristic of the soil. The decreased cloudiness and long continuance of sunshine are important features, and the quality of the sunshine, through the diathermancy of the air, is greatly enhanced. The stimulation of the cooling temperature with altitude, the increased heart action resulting and the mechanical effect of the lessened atmospheric pressure upon the blood circulation, giving an onward push to the pulmonary currents and favoring a more complete capillary flow, especially within the thorax; the easy transpiration of vapor from the body, especially through the lungs by means of the contrast in temperature between that of the body and the circumambient air, and the increased moisture absorbing quality of the latter are important features. The free and constant motion of the atmosphere, the quick radiation of heat from all surfaces, and its heightened electrical state, vivifying the air through its free static electricity and the resulting production of ozone: All of these, in fact almost every favorable quality of climate, are enhanced in their effect by an appropriate degree of air rarefaction; provided the counter condition is secured, namely, increased freedom of action and proportionate receptivity of the individual.

But this freedom of physical life, with its resultant bodily resistance to disease, especially to a dyscrasic one like tubercu-

*Transactions American Climatological Association, 1900.

losis, is only possible in its perfection when enjoyed out in the open. *Then* the cure of pulmonary tuberculosis, as well as its hygienic prevention, is established on a right basis.

2nd. How is it that the bad effect of deficient ventilation (which I believe is the main predisposing cause of tuberculosis) is increased by altitude? If there are impurities in the air, rarefaction would seem, on first thought, to thin them out and dissipate them. But it is not so much any defects pre-existing in the atmosphere which are dangerous, as it is the poisons we add by living in and breathing it. A barnyard with the sun shining on it may be a heaven of health compared with a closed rosewood palace with the influence of the sun disbarred. It is the starvation of oxygen produced by air rarefaction which magnifies the evil effects of deficient ventilation.

You may say, with Parke's Practical Hygiene as authority, that the deprivation of oxygen is not felt ordinarily by healthy human beings till a loss of 14 per cent. is reached; and I may reply, that the amount of oxygen which can be absorbed is limited any way, and that even when breathing pure oxygen saturation is only sooner reached than when breathing the ordinary air. (Curtis.) This does not, however, make much difference with the general proposition that for a given lessened barometric pressure a proportionately greater bulk of air must be breathed in order to get the equivalent amount of oxygen. In other words, to maintain the *status quo* of even deficient ventilation in the altitudes a proportionate additional space should be allowed for all sleeping and living rooms.

Imagine a hospital at sea level, built say for fifty patients, with an allowance of 2,000 cubic feet per person. Suppose this hospital were moved intact to a little more than a mile above the sea, say between Denver and the eastern base of the mountains, where the barometric pressure is reduced to twelve pounds to the square inch, a loss of three pounds, or one-fifth. Without free ventilation that hospital must be enlarged to contain 120,000 cubic feet space in the patients' wards instead of 100,000 as before, in order to give them the same amount of oxygen on which to live.

The mechanical effect of the thinned air upon the functioned action of the heart and lungs could not compensate for the loss of oxygen in the closed rooms thus limited in size. In fact, by use the dead air point would be sooner reached without ventilation than at sea level. As the life of the air depends upon its free ventilation, that the vivifying influence of the sun may never be wholly shut out, so the hygienic prevention of tuberculosis comes to hinge upon this condition, free ventilation; and out-of-door life is even more a *sine-qua-non* of successful existence in high altitudes than it is at sea level.

A consideration of the altitude of approximate immunity from tuberculosis confirms this contention. A study of the very few cases of tuberculosis which, with the advancing of our defective civilization, do happen to occur in Colorado should and does, as I will show, harmonize perfectly with this idea.

I do not suppose there is any one so foolish as to claim an *absolute* immunity to tuberculosis infection for any elevation.

In a state like Colorado, where so many invalids seek restoration to health, and where opportunities for contamination by the germ are so plentiful, why should not some of the many sources of infection prove effective? There is nothing in the climate to guarantee that broncho or grip-pneumonia, an imperfectly recovering typhoid fever, a suppurating appendicitis, or other septic state, long confining a patient under conditions which would be causative of tuberculosis at sea level, will not have a like result in Colorado.

Yet the fact remains that tuberculous infection, reaching an advanced stage of the disease, is so rare an occurrence in Colorado as to be remarkable. Here in the largest city in America located at such an altitude, during the twenty-seven years I have practiced medicine in Denver, the ratio of death from tuberculosis to all deaths, excluding those cases imported or contracted elsewhere, has been only from one-eighth of one per cent. up to less than four per cent. During this same period cities in the eastern states have had a three or eight times greater ratio of tuberculosis to total mortality, exclusive of the migrating

consumptives they have sent away to the south and to the Rocky Mountain regions, which greatly lessened their consumptive mortality and increased ours.*

When one thinks, which I have seen, of an ignorant third-stage consumptive from the east, fastening himself as a visitor upon a poor family of eight, including little children, living in three small rooms, and he expectorating his myriads of bacilli upon the rough unpainted floor, one wonders that there are not more cases of infection than there are, especially in a large city like Denver where there are so many overcrowded small houses. Looking up and investigating the cases of tuberculosis, probably originating in Colorado, which I have myself seen or heard of during the past year, I find that they are all explainable in accordance with what has been said above. Two cases reported by other physicians in country towns seemed to be due probably to other causes than known deficient ventilation.

One of these, an illegitimate young woman, age 22, with inheritance to tuberculosis on mother's side, never strong, and had broncho-pneumonia at 13, pleurisy at 17, pneumonia at 18. followed by night sweats and hemorrhages a year or two later; undoubtedly tubercular, but now under treatment and doing fairly well.

Another case of a young man of 22 is doubtful only as to the origination of his tuberculosis in Colorado, as his lungs were said to be "weak" when he came to this state at age of 12. Slept on ground floor in room twelve by fourteen feet; had la grippe about two years ago and never recovered entirely; was found to be tubercular in June, 1900.

My own cases of this class, four in number, are all doing well, especially when removed from the cramped, unventilated quarters in which they developed the disease.

1st. A young woman, age 18, born in Colorado, an undersized member of a family of seven all of whom had "eczema,"

*This Denver four per cent. mortality is, according to a report tabulated by Dr. William P. Munn, when Health Commissioner, and for the six years, 1893 to 1898 inclusive. Two-ninths of these cases, said to have been contracted in Colorado, were classified as *meningial tuberculosis*. A remarkable ratio, and full of suggestion as to its cause.

from doubtful, probably specific, inheritance on father's side; living in very cramped quarters near a mill ditch. The mother, a robust woman, says her daughter slept with her, for nine months previous to her illness, in bedroom eight by ten by nine feet in size. This defective, neurotic, undeveloped girl, now 20 years of age, was found by me to be tubercular in third stage June, 1899, though she claimed she had never been sick in bed.

2nd. An Italian woman, age 29, married nine years and has five children, youngest one year old, not weaned from the breast when this patient was first seen by me in August, 1900. She was the wife of a former patient of mine who had miner's consumption. Five months previously this woman had a "severe cold" from which she had never recovered. The possibility of infection is admitted; but she slept with her two children in a close room, dimensions nine by ten by eight feet, and was otherwise most unhygienic in the care of her person; in fact had not taken a full bath for five months.

3d. A poor sewing woman, age 37, undersized, spinster, lived in Colorado twenty-one years; always confined at home sewing. For three years has slept with her sister in a bedroom, size eleven by nine by nine feet, opening off from the kitchen. Had la grippe February, 1900, and in August the same year, cough and expectoration having continued since, we found bacilli in sputum.

4th. A young woman of 27, married six years, clerk in a Denver agency office for three years, where there were eight others, all working in three adjoining rooms; two of these clerks were expectorating consumptives, at times using the waste baskets instead of spittoons. During all these three years she slept at night, with her husband, in a room a consumptive had previously occupied, size about eight by ten by nine feet, and it was on the ground floor and had but one window. This room was located on the north side of a small house which was shut in between two others. The tuberculosis was laryngeal as well as pulmonary, the sputum yielding T. B. germs in large numbers. It may have been a case of infection, as there were plenty

of chances, but the condition as to deficient ventilation was certainly contributory. To get her out of town, Arizona was recommended, where at last accounts she was doing very well.

It is thus reasonable to conclude, I believe, that deficient ventilation is the key note of the *cause,* as is out door living or perfect ventilation the key note of the *cure* of tuberculosis. It is mainly an acquired disease, since Dr. Schreiber tried many new born children with the tuberculin test and "during the first week of life they did not once react;" that is, only a dyscrasic tendency is transmitted from parents to child. How variously but certainly this individual susceptibility is magnified by our faulty bringing up and by our after life constitutes the history of the acquirement of tuberculosis.

It is not acquired during a life out in the open, else our cattle, grazing on the western plains, would show the existence of the disease as they do not now. That acquirement, as is generally conceded by medical men, comes (as it does with monkeys and other animals) through domestication with its too close confinement in unventilated rooms.

The best we can do, then, is to insist that the necessity of outdoor living must be appreciated, especially in Colorado where the benefits of such a life are enhanced above what obtains in the lowlands; also let us insist that legislation take hold of this question of deficient ventilation, that this potent cause of this dyscrasic disease may be in a measure eliminated.

GONORRHOEAL RHEUMATISM.

BY HOBART E. WARREN, A. B., M. D., DENVER, COLO.

Gonorrhœal rheumatism must bear as great an interest for us to-day as any other serious affection whose etiology and treatment are apparently not definitely settled. This term does not refer to arthritis alone, but to the inflammation as well of bursæ and the theca of muscles, tendons and nerves. Gonorrhœal arthritis is by far the most common and a very serious evidence of gonorrhœal rheumatism, and most of our data are derived from that source.

Gonorrhœal rheumatism is more prevalent in some localities than others, doubtless due to lax moral conditions and to the inefficient treatment of known cases of gonorrhœa. It occurs as 1 of every 22 cases of illness in the Philippines, less severe in character during the rainy season. In all places it is of far greater frequency among males than among females, Muhsam reporting 41 cases of which 24 were men and 17 women, while Lorimer in an analysis of 250 cases found 232 males and only 18 females.

As a complication of gonorrhœal urethritis, gonorrhœal rheumatism occurs, according to Grissole, in 2.8 per cent. of cases. Besnier and others give 2 per cent. The age limits are practically from 17 to 58 years, although no age is exempt.

The usual indirect cause of gonorrhœal rheumatism is gonorrhœal urethritis in the male, gonorrhœal metritis in the female, though the implantation of the gonococcus on any mucous surface may be followed by this complication, as is evinced by reported cases of gonorrhœal rheumatism in the new born following gonorrhœal ophthalmia. The fact that gonorrhœal rheumatism is less frequent in the female than in the male, is due to the more open anatomical structure and the more resistant coverings of the uro-genital tract of the former.

Many theories as to the direct cause of gonorrhœal rheumatism have been advanced, but the most recent careful research

would indicate that the gonococci themselves and their toxins are concerned. The mode of metastasis is through the blood, and although in many acute and in all chronic cases, as far as is known, examination of both effusions and tissues by means of preparations and cultures has been negative, yet these failures are at once accounted for by either too late an examination or a faulty technique.

The gonococci rarely exist in an exudate after the acute stage, being destroyed either by the action of the exudate itself or by the advent of other bacteria. Rindfleisch has demonstrated the gonococcus in 19 out of 30 cases of effusion into joints, sheaths or bursæ, the cases in which they were found having been examined during the first week or at the time of an acute exacerbation. The chief fault in technique has been the use of poor culture media, but since the provision of hydrocele-agar by Dr. Young of Johns Hopkins, the gonococcus has been more often demonstrated than heretofore. This medium is made by mixing sterile human hydrocele or ascitic fluid with liquefied nutrient agar in the proportion of a little more than 1 to 2; slant cultures are better for use than plate cultures.

Finger and others have caused gonorrhœal urethritis in man by inoculation with cultures made from joint effusions. Wertheim has found the gonococcus in the endothelium of blood-vessels, Thayer and others in the blood, Scholtz once in a case of erythema nodosum and recently the gonococcus has been demonstrated in tendon-sheaths, joint-capsules, the heart, subcutaneous abscesses and in cases of pyo-nephrosis, acute and chronic cystitis and peritonitis. Dr. Young found the gonococcus in 10 cases of arthritis and in several of them subcutaneous abscesses containing pure cultures of the gonococcus developed in the arthroomy wound. There may be found associated with the gonococcus, the staphylococcus albus and aureus, bacillus coli communis, pneumococcus, tubercle bacillus, bacillus pyocyaneus and saprophytes of the urogenital tract. Specimens of tissue or effusion should always be stained with a saturated alcoholic solution of methylene blue and if a diplococcus is found, Gram's method pursued and cultures made on hydrocele-agar. If the cover-slip preparations are negative, cultures should be made at once on both ordinary and special media, for cultures are often positive where preparations show nothing. The gonococcus varies in virulence, the same being greatly increased during menstruation

and pregnancy, in parturition and after abortion. Some cultures will live only a few days, others several months.

The toxins are apparently contained in the bodies of the gonococci, both alive and dead, for the filtrate of a pure culture is non-poisonous, while both the live and dead bodies injected subcutaneously produce inflammation and fever in both man and animals.

Other theories as to the direct cause of gonorrhœal rheumatism such as the action of the ptomaines of the gonococcus, associated pyogenic infection, the combination of gonorrhœa with syphilis, rheumatic diathesis, articular rheumatism, gouty diathesis, posterior urethritis, inflammation of the prostatic veins and urethral injury are incorrect. The gonococcus itself is the cause, though one or several of these conditions will establish a predisposition to or accentuate an attack of gonorrhœal rheumatism.

The pathological changes caused in any tissue, are first those of inflammation, followed, however, not by destruction but by an excessive reparatory process with the formation of much fibrous tissue, resulting in joints in a fibrous anchylosis elsewhere in thickening and in duration. With suppuration and rupture of capsules or sheaths destruction may occur. On mucous surfaces the gonococcus tends to cause a pyogenic, on serous surfaces a plastic inflammation, but this is not by any means invariable.

The reaction in joints may be of two sorts, either a synovitis with effusion of a serous, sero-fibrinous, fibrinous, hemorrhagic or purulent character, or a phlegmonous condition with slight effusion and much inflammation and œdema of the surrounding tissues. It is by no means necessary, as formerly supposed, that a mixed infection exist in order to produce suppuration. The gonococcus in pure culture is often the cause of purulent effusion. The toxins may act as simple irritants of the vaso-motors or may affect the trophic centers, and marked muscular atrophy is much more common with gonorrhœal rheumatism than with ordinary rheumatism. In all chronic articular changes, the joints return very slowly to a natural condition.

The onset of gonorrhœal rheumatism varies according to associated conditions and sex. The virulence of a gonorrhœa plays no role, as some of the most virulent cases never show symptoms of gonorrhœal rheumatism. In the female, for reasons

before stated, the advent is late, being anywhere from 3 to 7 months after a gonorrhœal infection; in the male, although it usually appears in the third or fourth week, yet the possible limits are from 4 days to 10 months. The usual time of onset in the male would seem to support the theory that gonorrhœal rheumatism is always caused by gonorrhœal infection of the posterior urethra which usually supervenes at that time as a complication of anterior gonorrhœal urethritis, but its fairly often reported occurrence a few days after infection precludes such supposition, and in several of my own cases, there has been no evidence whatever of posterior urethritis. I have seen, however, much less gonorrhœal rheumatism in private practice during the last three years than previously, which I attribute to the fact that I avoid all irrigation methods of treating urethritis, all strong injections, and never pass an instrument of any kind into the anterior urethra as long as a discharge or shreds passed during micturition show microscopical evidence of the gonococcus, thus avoiding urethral injury and minimizing the chances of complicating posterior urethritis. Possible associated conditions before noted undoubtedly favor extension to deeper parts with freer portals of entrance, and prepare certain localities for subsequent infection with the gonococcus. A gouty diathesis is far more serious as a predisposing cause than a rheumatic, as is shown by Lorimer's cases in which only 2 per cent, had a rheumatic tendency while 13.5 per cent. possessed an hereditary tendency to gout.

Forms of gonorrhœal rheumatism, other than gonorrhœal arthritis, are so rare that the symptomatology of this form is practically that of gonorrhœal rheumatism.

In pure gonorrhœal rheumatism, the initial pyrexia is usually sub-acute, 100° to 102°, although in some cases generally mon-articular there may be no pyrexia or only a slight evening rise to 99°. One or more joints are involved, and remain so in varying degrees of inflammation throughout without migration. Perspiration is often profuse, but the odor is not acid, as in ordinary rheumatism. There may be simple flying pains in the joints, or again the decided pain and tenderness of inflammation in varying degree from simple intra-articular swelling with unmistakable fluctuation to the phlegmonous type with marked extra-articular œdema. Palpation often reveals certain definite points of tenderness, due to the herding of the gonococci. The

number of joints involved varies from one to several, but no two show at the same time a like grade of inflammation. In my experience, the majority of cases have exhibited a polyarthritis, and in a collection of 250 cases, one only was mon-articular. The order of frequency in which the joints are affected is as follows: Knees, ankles, wrist, hands, elbows, hips, shoulders, temporo-maxillary, cervical and sterno-clavicular joints.

Muscular atrophy is common and contractures with subluxation may occur.

Cardiac disturbance is rare and when present is due to an infective endocarditis.

The condition may undergo resolution in a few weeks, or with acute exacerbations of the urethral inflammation also exacerbate. Repeated relapses tend to produce a chronic hydrarthrosis frequently mon-articular and non-febrile, the chronic asthenic type, or to lead to suppuration with chills, redness of the part, severe pulsating pain and phlegmon. Anchylosis or pyæmia and death are the probable results of the latter course.

With an associated rheumatic tendency, the initial pyrexia is acute, 102° to 103°, the arthitis migratory and the perspiration acid, but in 10 days to 2 weeks the condition assumes the character of pure gonorrhœal rheumatism, the inflammation settling in one or several joints. This class is more liable to exhibit cardiac complication.

Gonorrhœal tendo-vaginitis and bursitis are rare. They are accompanied by chills, light fever and local symptoms of inflammation. The extensors of the hands and fingers, the flexor longus pollicis, the flexor longus digitorum pedis, the sheaths of the biceps brachii and the tendo Achillis are most often affected. The bursæ commonly involved are the one in front of the tendo Achillis and the one under the os calcis; less often those of the wrist, ankle, patella, tuber ischii, the biceps and the psoas muscles.

A series of central and peripheral nervous disturbances of gonorrhœal origin may also arise causing neuralgia, hyper- and para-esthesia, reflex irritability, girdle sensations and muscle-cramps.

The diagnosis of gonorrhœal rheumatism may depend not only upon the symptomatology but also upon the previous history of the case and the therapy.

Former attacks of gonorrhœal urethritis with associated gonorrhœal rheumatism always predispose to that complication in any subsequent attacks to urethritis.

A patient who has or has had within two or three years an urethral discharge containing gonococci may have an attack of rheumatism of gonorrhœal origin. In gonorrhœal rheumatism, the fever and pain are less intense and disappear more quickly than in ordinary rheumatism, while the joint condition persists and the systemic disturbance is not so great.

In gonorrhœal rheumatism fewer joints are involved than in articular rheumatism; no two joints show the same grade of inflammation at the same time and muscular atrophy is more common in the former.

In gonorrhœal arthritis, there are liable to be definite tender spots about the joint, while in ordinary rheumatism the tenderness is general. Hydrathrosis is common in gonorrhœal rheumatism; not so in the ordinary type. It attacks the large joints, there is a liability to simultaneous affection of sheaths and bursæ, and lastly the administration of anti-rheumatic remedies does not reduce the fever and pain, as in ordinary rheumatism.

Scarlatinal rheumatism resembles the gonorrhœal form in its tendency to suppuration and the rarity of cardiac complications, but the first is very fleeting.

Gonorrhœal rheumatism is not a destructive affection, whereas arthritis deformans is.

The prognosis in gonorrhœal rheumatism must be a very guarded one, although it is much easier to-day, by the performance of early aspiration or arthrotomy, to prevent pyarthrosis or the subsidence into chronic hydrarthrosis. Some of the mildest cases, however, fail to undergo resolution with the most careful treatment. With simple serous effusion, recovery may take place in six weeks to two months. A sero-fibrinous or sero-purulent effusion or the involvement of many joints greatly prolongs the illness, sometimes indefinitely, which may end in partial or complete anchylosis of the joints. The reabsorption of thickenings about sheaths and bursæ covers an equally long period.

The treatment must be both local and general. In most cases, a posterior and anterior gonorrhœal urethritis will coexist. If an anterior urethritis alone is present, treat in the usual

way with injections of protargol of increasing strength, from ¼ to ½ to 1 per cent.; if a posterior urethritis only exists, give deep instillations of nitrate of silver from ½ per cent. upward every two days, or in some cases deep injections of 5 per cent. protargol are more efficacious. If both the anterior and posterior urethra are infected, teach the patient to irrigate the entire urethra, injecting protargol in increasing strengths into the bladder, there to be held a few moments and then voluntarily passed. In the female treat metritis or urethritis with protargol, 3 per cent. for the uterus, 1 per cent. for the urethra. Vaginitis should be treated with 1 per cent. protargol douches. Urethral bougies, uterine suppositories and vaginal cones of protargol may be used with good results. Always administer methylene-blue internally, best given as methyloid capsules, which do not disturb the digestion or cause strangury, one to two capsules three times a day after meals. This seems to shorten the course of any gonorrhœal affection. In the second and third weeks of urethral treatment, combine with the protargol in equal parts, the same per cent. solution of yellow muriate of hydrastis, for both its antiseptic and astringent effect. The bowels must be freely opened, preferably by calomel.

The affected joint or joints should be immobilized by splints so applied as to allow the application of a rubber or flannel bandage, exerting moderate pressure. The joints are subjected to a bath of dry heat morning and evening for one-half hour, subsequently painted with pure guaiacol, and rebandaged. With any considerable effusion, the joint must be at once aspirated, washed out with 5 per cent. protargol, normal salt solution and finally a sufficient amount of 1 per cent. protargol injected and left in the joint. Do not use corrosive sublimate. The aspirated effusion is to be at once examined microscopically and cultures made. If gonococci are found and the inflammation continues and the effusion re-accumulates, arthrotomy should be performed, the joint thoroughly irrigated with proper antiseptics and the wound closed usually without drainage. Arthrotomy gives some of the best results with complete recovery of the use of the joint. If upon aspiration a purulent effusion is found, it is best to perform arthrotomy at once.

Morphia may be given for pain and in some cases of periarticular inflammation, tendo-vaginitis and bursitis, hot applications of lead and opium wash are very serviceable.

Always administer ordinary anti-rheumatic remedies at the onset, both for diagnostic purposes and to eliminate any such associated element. With subsidence of symptoms, administer iodide of potassium by mouth, institute passive motion and massage. Do not attempt to break up joint adhesions as long as an urethral discharge exists showing gonococci.

I would suggest the use of unguentum Crede or 75 per cent. ich-thyol ointment in some cases, although I prefer as a rule guaiacol on account of its counter-irritant but non-vesicating action.

Extension must be applied in some cases with marked tendency to contraction.

Bursæ may be treated in the same way as joints. Unguentum belladonnæ et hydrargyri may aid in removing indurations.

The points which I wish to emphasize in this paper are:

1st. Toward prophylaxis do not treat gonorrhœal urethritis by irrigation methods or with strong injections, and never introduce an instrument into the urethra so long as a discharge or shreds are present showing the gonococcus. As an exception, one may of course use the deep urethral syringe when indicated.

2nd. Gonorrhœal rheumatism may occur without previous infection of the uro-genital tract.

3rd. The gonococcus and its toxins are the direct cause of gonorrhœal rheumatism, even with suppuration.

4th. We should endeavor to provide ourselves with the proper media for cultivation of the gonococcus.

5th. Definite points of tenderness about an inflamed joint are peculiar to gonorrhœal arthritis.

6th. Gonorrhœal arthritis is not distinguished by being a mon-articular affection.

7th. Always treat at once the existing urethritis.

8th. Do not hesitate to aspirate or perform arthrotomy early.

9th. Never fail to administer anti-rheumatic remedies at the start.

10th. Make early use of dry heat.

MOTHER'S MILK.

BY EDWARD C. HILL, M. D., DENVER, COLO.

Milk may be defined as an emulsion of oil globules suspended by means of caseinogen in a saccharine protein aqueous solution. These fat drops vary in size from .0015 to .01 mm. in diameter, and in number from 1 to 5 million per cubic centimeter. In addition to small quantities of lecithin and cholesterin, they contain a little lipochrome or yellow coloring matter similar to the lutein of yolk. The fat of breast milk constitutes normally nearly 4 per cent. of the same. The caseinogen of human milk, amounting to about 1 per cent., is held in suspension by calcium phosphate; it can be separated as a granular powder by clay filters, and the curdling of milk follows when the phosphates are removed by acids. Lactalbumin also makes up nearly 1 per cent. of breast milk, and is almost identical with serum albumin. The proportion of lactose in human milk is fairly constant—from 6 to 7 per cent. The inorganic salts (about .2 per cent.) include the phosphates of Ca, Mg, K and Na, the chlorides of K and Na, and slight traces of iron. Other unimportant organic compounds are lactoglobulin, leucin, creatin and phosphocarnic acid, a phosphorus-holding substance peculiar to breast milk. About 8 per cent. by volume of gases can be aspirated from the fluid, chiefly O, N and CO_2. It is not improbable that mother's milk contains some undiscovered specific ferment and antitoxic compounds which serve to protect the child in a measure against infection and to aid assimilation.

The percentage of each of the normal ingredients of breast milk is quite variable (except sugar), even under normal conditions from day to day. The more frequent the nursings the denser the milk and the greater the total solids (normally about 12 per cent.) The strippings of the breast are seven times as rich in fat as are the first few watery drops. Menstruation increases the caseinogen temporarily. Proteins and total solids are abnormally high in the colostrum period, especially in pre-

maturity, and one or both diminish below the normal toward the end of lactation and in times of deterioration of the milk from other causes. Worry and emotions raise the proteins and may render the milk poisonous to the nursing child. The quantity of milk varies largely with the amount of fluid ingested; it is diminished by chills and fever.

Bovine milk differs from the human variety in containing more caseinogen and salts, but less fat and sugar. The paracasein curds formed from cow's milk in the stomach are tougher and more indigestible than the flocculent human coagulum.

Under the microscope one sees a great number of highly refractive oil globules, and also in the colostrum period numerous large epithelial cells ("colostrum corpuscles") which have undergone only partial fatty degeneration. A few staphylococci are to be found in nearly every specimen of breast milk. The presence of pus or streptococci indicates infection, probably with abscess formation. According to von Jaksch, tubercle bacilli are occasionally present in the milk of phthisical women. Mother's milk taken to be examined quantitatively should be either a sample of the whole breastful or a specimen taken about midway in nursing. It should be well mixed by shaking before applying the tests. Measurements are best made with a graduated pipet.

The reaction of milk is ascertained by means of both red and blue litmus paper, and is normally feebly alkaline in a fresh specimen. The sp. gr. of human milk averages 1.031, and may be determined with a correct urinometer, or, more accurately, by means of the picnometer. In making corrections for temperatures below the standard of the hydrometer, one degree of the scale may be subtracted for each 10° F. below the standard temperature.

The percentage of total solids is readily calculated by evaporating to dryness 5 cc. of the milk in a weighed platinum dish on the water bath, then transferring to the oven at 100° C. until the dish and its contents cease to lose weight, cooling in a desiccator and weighing. The ash is estimated by careful ignition of the residue at a dull red heat until all the organic matter is burned away.

The creamometer method of estimating fats, as in the simple Holt apparatus, is quite unreliable, varying with dilution, agitation, temperature and other factors; indeed, a thin or watered milk may yield more gravity cream than one of normal density. The percentage of cream rising in twenty-four hours usually ranges from 10 to 20 per cent. Since the opacity of milk varies with the amount of contained fat, pioscopic methods are of service in estimating this constituent. With a little experience in the use of Feser's lactoscope, the findings can be made accurate to within .25 per cent. Another convenient clinical method for determining the proportion of fat is with the centrifuge. To 5 cc. of milk is added, with shaking, 1 cc. of a mixture of 13 volumes wood alcohol, 37 vol. amyl alcohol and 50 vol. HCl, and the tube or bottle is filled to the neck with conc. H_2SO_4, well shaken and revolved for three minutes, when the percentage of fat can be read off directly.

The percentage of sugar is best determined as follows: Dilute 10 cc. of milk to 200 cc., add acetic acid drop by drop till coagulation takes place, pass CO_2 into the liquid for fifteen minutes and let stand to settle; filter, wash residue and coagulate albumin and globulin in filtrate by boiling; filter again and estimate the resulting glucose by means of Purdy's quantitative test.

The proportion of proteins may be estimated by difference; by gravimetric analysis, pptg. with tannin, which is then, after drying, washed away with a mixture of 1 part alcohol and 3 parts ether; or more simply, by the use of the centrifuge after keeping 10 cc. of the milk for twenty-four hours in a milk buret in a warm place, to separate the cream and curdle the caseinogen. The protein mixture is drawn off from the supernatant cream, treated with excess of Esbach's reagent and centrifugated till the reading is constant—each 1/10 cc. is approximately equivalent to 1 per cent. proteins by weight.

A good volumetric method for proteins is that of Berggran and Winkler. The reagents required are (1) a freshly made aqueous solution containing in each 100 cc. .2 gm. HgI_2, 1 gm. KI and 1 cc. of 1:10 Fe_2Cl_6, (2) a n/100 solution of sodium thiosulphate; (3) a 1 per cent. boiled and filtered starch solution. Number 1 is standardized by titrating with No.

2 in presence of No. 3. Then 5 cc. of the skimmed or centrifugated milk are diluted with 20 cc. of water, and to this dilution just 5 cc. of No. 1 are added, and the mixture is titrated with No. 2 in presence of No. 3. From the difference in cc. of No. 2 required to decolorize the starch-iodin combination in the first and in the second instance, the amount of iodin that combines with the proteins is determined in the ordinary manner, and this product multiplied by 16 yields the weight of proteins in the 5 cc. of milk. To estimate albumin separately, 10 cc. of milk in a flask are diluted to 50 cc., warmed on a water bath to 40° C., casein pptd. by a few drops of acetic acid, half the filtrate (5 cc. of undiluted milk) taken and treated as above. The difference between this finding and the total proteins represents caseinogen.

The vital importance of breast feeding is exemplified by the official statistics of the German government, which show that of artificially fed infants 51 per cent. perish during the first year, while only 8 per cent. of those nourished exclusively at the breast succumb. Aside from poodle-petters, most mothers are willing to suckle their young when the facts are plainly stated to them. Some should not do so, namely, those afflicted with tuberculosis, syphilis, cancer or other cachexia, epilepsy and other convulsive attacks, plumbism, hydrargyrism, very severe acute affections (septicemia, typhoid, small-pox) or suppurative mastitis; pregnancy also contraindicates the continuance of nursing for long. In a few mothers, in spite of every effort, we cannot get the "living founts" to flow. A scant supply, however, should not be despised, since a half-and-half diet is generally much to be preferred to bottle feeding alone. Regularity in nursing should be insisted upon, every two hours at first in the day. The time to wean (usually about nine months) is often indicated by an over-frequent desire of the child to nurse, sometimes tugging fretfully at the nipples nearly the whole night. If a nursling sucks more than 20 minutes at a time, the milk is probably lacking in quantity or in quality. The process of weaning should be gradual when practicable, and if possible ought to be postponed till the approach of cool weather.

The true test of mother's milk is gain in weight—about a half ounce daily as a rule. When the weight increases as it

should, we may safely disregard slight symptoms of indigestion, green discharges and the occasional appearance of paracasein curds in the stools. Given the opposite condition, however, of a stationary condition or even loss in weight, we should at once institute an enquiry into the amount and composition of the milk. A good breast secretes from one to three pints daily. The average capacity of the healthy infantile stomach rises from one ounce at birth to three ounces at 2 months, six ounces at 6 months, and nine ounces at 12 months. As already stated, too frequent nursing causes a relative increase of solids, exciting colic and griping and green stools, while milk taken at too prolonged intervals is deficient in nutrient properties. Neurotic women, old mothers and those who have borne children in rapid sequence are likely to yield milk somewhat below the standard.

Gastro-intestinal symptoms in the nursling may be due either to excess of fats or of proteins; malnutrition, to a deficiency of one or both of these constituents. An excess of fats may be reduced by diminishing the proteins in the diet, and vice versa; fatty food does not increase the richness of milk. Excessive proteins are reduced by a vegetable diet and by walking and other exercise; the mother's milk may also be diluted directly or indirectly, by giving her more water to drink. A scanty diet decreases all the milk solids except sugar, which is increased slightly by much vegetables.

Sublactation is very common in both the obese and the weakly. The former need less food and more fresh air and exercise. The latter need mental and physical rest, tonics (strychnine, arsenic, hypophosphites and non-astringent iron preparations), plenty of fresh air and a very nourishing but palatable diet containing milk or milk punches, gruels, cocoa, somatose and beef tea. Malt liquors, such as ale and porter or malt extracts, augment the flow of milk in the second class, but are manifestly contraindicated in stout women. Jerome Walker recommends that the nursing mother drink in the night a glass of milk flavored with a teaspoonful of essence of ginger. Obstinate constipation sometimes interferes with the secretion of milk, and is best remedied as a rule by dietetic regulations. The administration of small doses of pilocarpine has seemed to me of some service in agalac-

tia. The ingestion of nutmeg, anise and other volatile substances by the mother is advocated as being attractive to the infant, causing it to pull more vigorously at the nipples and thus excite a greater flow of milk.

The daily quantity of milk when excessive can be diminished by restricting the amount of fluid ingested, by the use of a rather loose bandage and a fatty diet. To assist the drying up of the secretion at weaning time, one may use a firm compress, salines, phytolacca, and camphor and belladonna internally and externally. In case of sore nipples without suppuration, a nipple shield may be utilized, or the milk may be pumped and fed from spoon or bottle.

Many drugs pass through the mother and affect the suckling. Among these are opium, bromides, iodides, Hg, As, Sb, Bi, Zn, belladonna, turpentine, copaiba and salicylates. Salines or organic acids (sour fruits) taken by the mother are likely to gripe the child, and the same is in some instances true of the common garden vegetables. The offspring of a morphine habitue may acquire a singular tolerance for opiates. Breast-fed children sometimes have rickets or scurvy, though not nearly so often as when nourished on patent artificial foods. Such an individualized management of breast milk as to secure the best results to mother and infant requires no little care and judgment.

CONSIDERATION OF THE RADICAL TREATMENT OF UTERINE CARCINOMA.

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It is an accepted doctrine that cancer in its inception is a purely local disease; that it should be promptly and completely removed, and that the earlier this is done the greater the hope of its absolute removal and permanent cure. These general principles have guided the gynecologist in modifying the methods of attack upon uterine cancer as dictated by experience, and as the development of surgical technique permitted more extensive and

thorough operation, without prohibitive mortality. For a goodly number of years it has also been accepted as a rule that in all attempts to effect a radical cure of uterine cancer, the whole uterus should be removed.

In considering the value of hysterectomy in this connection, we must at the outset make a clear distinction between the results for carcinomas arising in the body and the cervix. We might very properly go farther and differentiate between the different pathological forms arising from the cervix—vaginal or supra-vaginal portion and body—as each varies histologically and in the rapidity and manner of invading the parametritic tissues, and hence give varying prognoses for operative procedure, but the time limit is too short to permit consideration of these details.

Carcinomas of the body very soon give rise to symptoms that demand attention, the diagnosis is made earlier, and they come to operation before the uterus is penetrated and the broad ligaments affected more frequently than do cancers of the cervix. In addition the broad ligaments at their upper border, where the lymphatics lie which are first affected, are readily removed far from the uterus either by the abdominal or vaginal operation, and therefore hysterectomy has proven far more successful for cancer of the body than for the cervix. Clark reports 60 per cent. of cancer of the corpus free two years after operation, as compared with 15 or 20 per cent. of the cervix. Jessett gives it as 83 per cent. after one year and 60 per cent. after six years for cancer of the body, as compared with 58 per cent. after one year and 40 per cent. after six years for cervical cancer.

While vaginal hysterectomy for cancer of the body is followed by a good degree of success, the general preference is for the abdominal route as giving the advantage to accurately determine the condition of the broad ligaments and as offering greater facility of removal at the farthest possible point from the uterus. The operative indications for these cases are so clear that they admit of little difference of opinion, apparently the success depending upon attacking them early rather than upon the route adopted.

Cervical cancers present great difficulties in operation, and no operative procedure yet proposed has met with any great de-

gree of ultimate success, a very large proportion of cases eventually dying of the disease after a longer or shorter period of immunity. The problem is still before us: How best to deal with cancer of the cervix and its extensions, and to this question we shall confine our remarks.

The earlier operations were performed both by the abdominal and the vaginal route, but the abdominal operations having a much higher mortality, the vaginal route became the more generally adopted. The results of vaginal hysterectomy by clamp or suture, with or without cautery, proved a comparatively safe operation, but the ultimate results were so disappointing that attention was turned to abdominal hysterectomy as offering, above all other advantages, a better opportunity of going wide of the disease, and many surgeons adopted it. In cases in which the uterus was fixed by cancerous infiltration of the broad ligament, especially along its base, it was often found difficult to separate the cervix through the abdomen, and it was proposed to free the lower portion of the uterus through the vagina as in vaginal hysterectomy, then removing the organ and completing the operation from above. This method, known as the combined, rendered removal easier. The mortality, however, after the abdominal hysterectomy, either simple or combined, remained much greater than by the vaginal route, and the ultimate results proved practically no better. These abdominal operations, and more careful inspection during operation, demonstrated very clearly that obviously affected cancerous tissue was often left behind, a sure starting point for prompt recurrence.

It was then proposed to follow the same principles guiding the general surgeon in breast operations, and not only to remove the uterus, but, in addition, to dissect out the ureter, resect and transplant it if necessary, and systematically to remove the connective tissue of the broad ligaments, with all cancerous infiltrations, and the affected lymphatics, including the iliac and lumbar glands if diseased. Hemorrhage to be controlled by ligature of the ovarian artery, the uterine at its origin, and if necessary throwing a ligature around the internal iliac. The details of this operation were successfully worked out by Rumpf, of Berlin, Ries, of Chicago, and Clark, of Baltimore, now of Philadelphia,

and is known by their combined names. Notwithstanding this very extreme dissection and removal of the parametritic tissues, the disease still returned. Werder, of Pittsburg, accepting Cheyne's suggestion that cancer cells were disseminated and implanted in the wound during the operation, offered in 1898 a modification. He makes the same dissection of the broad ligament and removal of pelvic glands as in the Ries-Rumpf-Clark operation, but instead of separating the uterus from the vagina at the vault, he carries the dissection down the vagina, separating it nearly to the vulva, and then, pushing the uterus and detached tissue through the vulva, sutures the flaps of the peritonitum over the pelvic wound,. closes the abdominal incision, and removes the mass from below by encircling the vaginal wall by an incision. This modification is generally considered an improvement. The attempt has thus been made to extend the field of radical operation to cases which otherwise could not be reached.

Sufficient evidence has not been accumulated to determine the value in ultimate results of these extended abdominal operations.

Few final results have been reported by those who have performed the operation in its entirety, and it is not yet demonstrated that this operation has been followed by the success expected from so radical and severe an operation, and that it has been materially greater than from less formidable procedures. Clark reports 21 cases, two of which died as the result of the operation. His earliest case was operated but six years ago, and he has recently made the statement that while he cannot give exact results, the largest number have already succumbed to a return of the disease. Pryor, who strongly advocates the abdominal operation, gives the primary mortality in 98 cases in which attempt was made to remove affected tissue beyond the uterus, as 11.2 per cent. He fails to say in how many of these cases the disease has already recurred. Wertheim advocates strongly the abdominal operation, removing the mass from below as advised by Werder. He reports 29 cases, in 11 of which the pelvic glands were affected, with a mortality of 10, nearly 40 per cent., from the operation, and says it is impossible to give any positive statement of the ultimate results at the present time. Pique and Mauclaire state that in their opinion the abdominal

operation has an operative mortality four times that of the vaginal.

The technique of the abdominal operation is not yet perfected and it is yet too soon to venture an opinion of the estimate in which it will ultimately be held. It would appear, however, that it has reached the limits of radicalism, and it remains to be proven by future reports that the ultimate successes are sufficiently greater than the lesser operations to justify the increased risks. There are inherent difficulties in the operation and the complications met with are many and of the gravest character. The operation is tedious in the most skillful hands, requiring not less than two or three hours; hemorrhage is often considerable, and shock profound. The operation is adapted only to those whose abdominal walls are thin, whose pelvis is easily accessible, and who are still strong and unexhausted by the progress of the disease. In addition to these points, Wertheim calls attention to the difficulty of dissecting the affected glands from the veins, and especially emphasizes the impossibility of determining the exact condition of the glands except by the microscope. Baldy and others doubt the physical possibility of removal of all pelvic glands under these conditions, and the knowledge we possess of the wide dissemination of cancer when it has once involved the lymphatics, and the known impossibility of recognizing microscopically and at the time of the operation the uttermost extensions of the disease, would suggest that absolute removal, even under favorable conditions, is exceedingly problematical when the disease has invaded the broad ligaments, and impossible if it has extended to the obturator glands, the iliac or the lumbar.

If in these cases we cannot remove all vestiges of the disease and must, in spite of every effort, leave some cancerous tissue behind, do we gain any material advantage in the period of immunity or prolongation of life by these extensive dissections sufficient to compensate for the greater risks incurred? Or would we do as well for our patients by adopting a definitely palliative operation with the minimum of danger? Where shall we draw the line for the radical operation? When should we be satisfied with palliative measures? And, further, does or does not

hysterectomy offer the best practical results as a palliative measure? These are questions still unsettled and we must look to the future for their solution.

During the five or six years that a few surgeons have thus led in the attempt to radically remove the disease by the abdominal route when obviously extending into and beyond the broad ligament, very many men have continued vaginal hysterectomy, improving the technique and removing cancerous infiltrations adjacent to the cervix farther into the broad ligament. Others, who adopted the abdominal route after disappointment with the vaginal, have returned to vaginal hysterectomy. The mortality from vaginal hysterectomy is very much less during recent years than formerly, and I believe, among better operators, it will be found to be well below 5 per cent. at the present time. Von Ott states that in 189 cases operated by himself the mortality was 1.6 per cent. Olhausen and Leopold each have had a series of over a hundred cases without mortality. Von Ott has recently collected 1,000 cases of various surgeons, which show a mortality of 10.3 per cent. Pique and Mauclaire collected 2,376 cases with mortality of 9 per cent. Another author has gathered 3,155 foreign cases also showing a mortality of 9 per cent. All these statistics are, I believe, misleading as to the present percentage of mortality since they include cases going back many years. Regarding the ultimate results, Von Ott has reported 250 cases operated upon over five years ago, thirty of which had no return. Statistics, however, give us little guidance, for we find on scrutiny that few tables are properly classified for fair comparison, and they are chiefly of negative value in demonstrating that when the patients have been diligently followed and faithfully reported, very few permanent successes have followed. Baldy states it as his belief that it is as low as 1 in 500. This, however, is a statement not founded on any known data.

The true remedy for these very discouraging results of the past must lie in early diagnosis and prompt operation. In every clinic a large proportion of cases come too late for any attempt at radical cure. At Johns Hopkins 68 cases out of 141, nearly 50 per cent, were clearly not operable. At a large German clinic only 20 per cent were operable, and Pryor gives it as

only 7 per cent of the cases presented, but this, for him, probably represents very carefully selected cases. The regrettable fact must be recognized that the disease is overlooked or mistaken in the local stage and seldom comes to operation until after the broad ligament has been involved, when, as experience has shown, operation only too often proves palliative.

Authorities are very far apart in their views of the proper method of operating. The Germans have very generally adopted the abdominal route. The French are divided, with a strong leaning to vaginal operation in ordinary cases, reserving the abdominal for special and incipient cases, if any, as Ricard advises. Richelot, after a very large experience, says: Vaginal hysterectomy is superior to every other method, but the operation to succeed should precede, not pursue, the disease; that abdominal hysterectomy is an extra resource in a very limited number of cases; when applied to an invading cancer, an impudence; for a limited one, an illusion. American operators are divided. Pryor, Ries, Russell, Clark and Penrose pronounce for the adbominal route. Boldt, Hall, Price, Kelly, Janvrin. Coe and Goffe hold to the vaginal route. Kelly, who stated before the American Gynecological Society in 1896 that we must abandon vaginal hysterectomy, has during the past year come out strongly advocating the vaginal route, with bisection of the uterus, as a means of gaining access to the more remote portions of the broad ligament.

It would be easy to multiply quotations, but I believe enough has been said to demonstrate that surgeons are still much at variance regarding the proper method of attack. We seek absolute results, but we must recognize that up to the present our efforts to master the disease have been largely futile. By very much the larger number of operations have proven palliative, with a very variable period of immunity. Few patients have passed a term of three years without evidence of return—and those who have passed six years are very rare.

To conclude: Operations on the lines laid down by Ries, Rumpf, Clark and Werder offer greater hope of radical cure in carefully selected cases than any yet devised. With early diagnosis and the employment of these methods, the percentage of

absolute cures will undoubtedly be increased. It would appear, however, from the evidence at hand, that its application may properly be confined to early cases and those which give evidence of only slight invasion of the broad ligament, adjacent to the uterus, if at all, as the only ones in which there is a reasonable hope of effecting a radical cure. Vaginal or abdominal hysterectomy, or the combined operation are, however, applicable to these cases, and are preferred by very many as offering equal advantages with less risk. In the absence of any consensus of opinion and more definite evidence in favor of one operation or another, the choice must be determined by the special indications in each case and the individual preference of the operator.

We must seek some guide with a view of determining when we may properly attempt a radical operation and when the case has progressed so far as to make the attempt futile. Although this dividing line has not yet been clearly drawn, I believe we have no better guide than the rule Olhausen gave us some years ago—that the case is not operable with the hope of a radical cure if the broad ligament is infiltrated to the extent of restricting the mobility of the uterus. Under these conditions we should select a distinctly palliative operation—one which seeks to give the longest immunity with the least mortality. If an hysterectomy is done, it would appear that the vaginal route is the preferable one as offering in properly selected cases fewer complications, less shock, quicker recovery, an equal prolongation of life in comfort, with least risk.

Hysterectomy, by whatever method, has not in the past been so successful as to close the door to consideration of other methods. There is much evidence that the cautery offers more than hysterectomy even in the early stages of the disease. Dr. John Byrne, of Brooklyn, has for many years opposed hysterectomy for all cancers of the cervix, and has persistently advocated high amputation by galvano or electro cautery, thoroughly burning the adjacent tissue. He presents statistics that have not been approached by any other treatment. He claims no mortality due to the operation in over 400 cases, absence of hemorrhage, shock, sepsis, almost absence of pain and prolonged immunity from re-

currence. In 40 out of 63 cases of cancer arising in the vaginal portion which he was able to follow, the period of exemption was from two to 22 years, an average of nine years. In 50 cases, involving the entire cervix, which he was able to follow out of 81 operated, 10 relapsed within two years, and the remainder had no recurrence for periods extending from two to 17 years, the average period of exemption in these 50 cases being nearly six years. These reports are less complete than we could wish, but very suggestive.

An enlarged experience may teach us that when the disease has progressed so far that absolute removal is improbable or problematical, it is much better to discard hysterectomy, having resort to the cautery.

Even in the early cases the cautery may be found the best method of destruction and removal. Dr. Byrne, in a personal letter, say that in all "fair" cases he has seen no recurrence.

DRY HEAT IN THE TREATMENT OF DISEASE.

BY R. W. CORWIN, M. D., PUEBLO, COLO.

Recently medical literature has been inviting our attention extensively to the effect of hot air upon disease, and Dr. Solomon Solis Cohen of Philadelphia is soon to have a book upon the market on this subject.

We cannot say this form of therapy is new; possibly there is none older, but like all else in this world of cycles, it comes around to be tried again. The ancient Egyptians understood the remedial value of heat, and to an extent, the use of hot air. The Japanese for a long time have used hot air in disease, and have a very simple but clever device for its application.

The Greeks and Romans had their hot air baths. "The remains of these baths may be seen at Pompeii to-day, and it is stated that at one time as many as 25,000 persons daily patronized the luxurious baths of Caracalla, the caldarium or hot-air chamber being regarded as an important factor."

The Indians of our own country still resort to hot air baths in case of illness, the kind of disease making little difference regarding treatment. The Navajo Indians have a very novel and effective method of baking their patients. They make a circular hogan or house about seven feet in diameter, by leaning stakes together and covering them with dirt, and at one side leave a small door or opening. The patient is placed upon blankets or skins in the hogan, and as many hot rocks as possible are quickly rolled in around him. The door is covered, and the patient is left to perspire, and possibly expire.

The apparatus constructed to-day by our manufacturers to take the place of the hogan is rather more convenient than the Indian's device. All are more or less familiar with the hot air machines upon the market, hence it is unnecessary to describe them. There are several points to be observed, however, when it is remembered that the body may be subjected to a temperatur of 400 degrees or more Fahr.

The apparatus should be constructed to prevent, as far as possible, external radiation of heat, flues arranged to carry off the products of combustion while the patient is being baked, a circulation of hot air within the oven, and protection for the patient to prevent burning.

In the general bath, the preparation of the patient and precautions to be observed are important. The whole body with the exception of the head is placed in the oven after being wrapped in cotton, flannel, gauze or Turkish towels, and placed upon a light mattress. The question of covering will soon be learned by experience to be too light in some, or too heavy in other cases. If too thin, the heat may burn; if too thick, congestion causes distress.

The extremities are often the greatest source of complaint, and should be especially watched and protected. If the covering be great, in some cases it will prevent rather than induce perspiration, causing discomfort. Cases of blistering have been reported, but with ordinary precautions there is no good reason for burning a patient.

During the process of baking, the patient requires careful

and constant attention. The pulse and respiration must be watched.

Much judgment should be exercised in giving a patient his first bath. A patient's first experience is accompanied by anxiety, and often by a dread of being burned or suffocated, especially if too much heat is applied, or the temperature rapidly elevated.

The temperature employed depends upon the condition of the patient and disease. It may vary from 120° to 400° Fahr. In all cases, the temperature should be increased gradually. Perspiration is usually sufficiently produced between the temperatures of 160° and 180°, but it is not uncommon to raise the heat to 320°.

The length of time the patient should remain in the oven or general bath is usually from fifteen to thirty minutes, depending upon circumstances. The local bath may be employed beneficially for a much greater period, one hour or more.

Water may be given the patient to drink, which will increase perspiration; and the head, face and neck sponged or covered with damp towels. The patient should be placed in flannel blankets after being removed from the oven, and may have sponge baths and massage, and should be protected until thoroughly cool.

Physiological Effects.—The first effect of the hot air upon the body is a contraction of the superficial arterioles and capillaries. This lasts but a few minutes, however, and then a noticeable dilatation of the vessels occurs, causing a deep flush to spread over the surface of the whole body. This condition is followed by perspiration, often very profuse. The first stage may be accompanied by uncomfortable symptoms, nausea, vertigo and difficult breathing, but they are partially, if not entirely relieved by the dilatation of the arterioles and capillaries. The pulse becomes noticeably fuller, stronger and more rapid, increasing from ten to twenty beats per minute. The temperature increases, varying from 1° to 5° above normal.

Respiration is almost without exception affected, and its movements increased from two to five per minute, the patient complaining usually of a feeling of suffocation and shortness of breath.

Relaxation follows. A numbing of the sensory nerves occurs, and a sense of comfort and relief from pain takes place.

Perspiration profuse and acid.

If there be œdema, it is decreased.

Thirst increased.

If the bath be continued too long, it will produce prostration, restlessness, muscular twitching, cardiac weakness, followed by alarming symptoms.

The patient, therefore, should be constantly and carefully watched. No two patients are alike or affected in the same manner, hence constant vigilance is imperative.

The secondary physiological effects are believed to be varied and far-reaching. A deep as well as superficial massage has taken place while in the bath through increased circulation, causing tissues and organs to yield and give up that which they have refused otherwise to relinquish or liberate. The kidney and bowels become more active, the skin softened, and a general toning of muscular and circulatory systems. A noticeable effect is produced on stiff joints. They are relaxed and often can be readily flexed and adhesions broken, which before resisted every effort in this direction.

Deposits in joints are usually absorbed to a great or less degree—sometimes very marked is the improvement.

There may be and often is increased tenderness in rheumatic cases at first, but that goes with the absorption of the urates, oxalates and other deposits.

Recently Dr. Hopkins of Cleveland has given us a very interesting article published in the Medical Record on "Superheated Air in the Therapeutics of Chronic Catarrhal Otitis Media." He has found hot air very satisfactory in the treatment of those cases where there was ankylosis of the ossicles; through increased circulation, deposits were absorbed. He claims out of 62 characteristic cases treated, 58 cures of deafness, the four failures occurring in very old people.

In the Therapeutic Monthly for May, Dr. Prescott de Breton, of Buffalo, N. Y., has an interesting article on "The Treatment of Disease by Local Applications of Superheated Dry Air," in which he gives a synopsis of 43 cases treated by his

method with very satisfactory results in most cases. The doctor appears to have gotten best results in cases of rheumatism, sciatica and sprains.

The following ten cases have been taken from those treated at the Colorado Fuel and Iron Company Hospital during the past year. The selection has been made with regard to the variety rather than any special class of cases:

Case 1. Miss L., age 29 years. While coming down a stairway slipped, and in trying to save herself from falling, took a step forward and struck a step with the right knee-cap. She was carried home and a physician was called, who diagnosed simple fracture of right patella without rupture of the capsule. The case was treated by plaster of paris splint, and at the end of three weeks pronounced cured. But she could not use the limb, which was stiff, and passive motion was ordered by her attending physician. Case became worse instead of better, and the patient left her attendant to call in another regular physician, who coincided in the view held by his colleague, viz., that the limb should be used. The patient was not satisfied with this advice, and in time came under my care. On examination, no visible signs of a pre-existing fracture were found, but there was a tender point in the knee, close to the insertion of the tibialis anticus muscle, and there was atrophy of all the soft parts. The knee was placed in a splint, and the patient ordered to use crutches. This was continued for a period of seven months, when she demanded a different course of treatment and commenced to talk osteopathy. At this time it was decided to test the virtue of hot or superheated dry air, and at the expiration of a two hours' baking it was possible to flex the knee to an angle of fifteen degrees without causing any inconvenience. This course of treatment was followed daily for a period of three weeks, until the injured member could be moved as freely as the other. The leg was then baked less frequently, and at the end of three months patient walked without difficulty. The leg was somewhat weak from non-use, but she experienced only a sense of fatigue after a protracted use of the member.

Case 2. Mrs. H. B., married, age 45. Admitted to hospital with Bright's disease and partial paralysis of right leg, fol-

lowing uremia; was given full and partial hot air baths until œdema disappeared, and urine showed only small trace of albumen; uremic symptoms disappearing quickly after three baths had been given, and the patient recovered full use of paralyzed muscles.

Case 3. Thomas Foley, 45 years of age. Admitted March 10 with syphilitic arthritis, which he said had persisted for months; motion was painful and limited. Was given daily baths with small oven, and after a week's treatment was able to use hands and feet with ease without full motion, which was never entirely recovered. Patient never had any pain from this time, though he was kept under stiff doses of K. I., which he discontinued when he left hospital on June 3, 1900. Some months later he was again admitted to the hospital and died from cerebral syphilis.

Case 4. Jack A., age 15 years, acute synovitis, knee. Two hot air baths were given and he went home well.

Case 5. Harry J., age 38. Gave history of acute rheumatism for several weeks before being admitted to hospital (August 16). Was given full baths when he was in such condition that he had to be carried to the machine, and yet after a forty-five minutes' bake at a temperature of 400° F. would walk back to his bed. Case was discharged cured October 7, 1900.

Case 6. Joe S., Italian, age 29. Admitted with fractured femur, which united well, but muscles remained stiff and seemingly bound down. Was given leg baths every other day for ten days, with perfect result following.

Case 7. Henry G., 58 years. Arthritis deformans, with marked deformity; motion painful and restricted. Gave him hot air baths every day for an hour's duration for a period of five days. Patient left much improved.

Case 8. Philip B., Italian, age 42. Admitted with diagnosis of pulmbism, which had not reached paralytic stage, but muscles crampy. One full bath relieved the above conditions, and after four baths patient was discharged well.

Case 9. John J., age 20, American. Admitted January 1, after being on a prolonged drunk, very nervous and on the verge

of tremens. A full bath was given at a temperature of 300° degrees F. for two hours, producing full diaphoresis. As soon as he was removed went into a quiet and peaceful sleep of six hours. The bath was repeated on January 2, and on January 3 he was discharged as well.

Case 10. Luke M., colored, age 38. Admitted February 18, 1901, with acute nephritis following variola. Face was puffed beyond all resemblance to a human being. There was fluid in the abdomen and pleural cavities, but heart was in good shape. One-thirtieth of a grain of strychnine was administered, and the patient was put in the oven for full bath. The temperature was slowly raised to 350° F. and kept at that point for two hours, ice being kept to the head constantly. Two hours after being removed from the bath his face bore some resemblance to that of a person. The following day bath was omitted, but repeated on the second day with the same course. This was kept up until all anasarca had disappeared and albumen had practically vanished from the urine. Case was given absolutely no other treatment except Mag. Sulph. to keep bowels open, but not to purge, and kept on liquid diet for two weeks. Case discharged on March 14, in a normal condition. Up to the present time no bad results have made their appearance.

I wish to especially express my appreciation of the goodness of Drs. Baker and Dyer, who are connected with the hospital, in assisting me in gathering these statistics, and caring for the patients while in the bath and at other times, and thereby making this report possible.

All cases in the hospital treated by the hot air method have not resulted so favorably, some only having been improved; others, receiving no benefit; and two cases can be recalled (acute rheumatism) which seemingly were aggravated by the treatment. A vast majority of the patients treated, however, with hot dry air have been markedly benefitted or cured.

I do not wish to be understood as advocating that superheated dry air is a cure-all, but I believe as an adjunct to other remedies it is of much value. In fact, there are few cases the bath should be given without internal medication, but as an aid to medicine I think it is of importance and of much service.

There is even a faint hope that hot air may prove to be of no little assistance in tuberculosis. It is with hesitation this is suggested, for there have been so many false hopes created to relieve tuberculosis; but heat, properly applied, especially locally, may be worthy of further trial than has yet been attempted.

In surgery there is no question regarding the efficacy of dry heat.

For sprains, stiff and tubercular joints, it has proven itself of the greatest value. It is worth the while of any physician or surgeon to give superheated dry air a thorough trial.

It is not an experiment; it is not new; it is safe and has been long tried. While much has been accomplished through its influence, I cannot feel that its limit has been reached, or all its secrets revealed.

DISCUSSION.

Dr. Warren: I think that there is very little doubt of what Dr. Corwin just said of the efficacy of dry heat in the treatment of disease. One should emphasize particularly the fact of using great care in the amount of dry heat used, especially in the joints and over bony prominence and large blood vessels and nerves on account of the danger of sloughing. One must be very careful not to raise the temperature too high. Dry heat is not only a deep massage—it is better than massage in that it is continuous and equal, thus preferable to solar heat which is often used. Where there are adhesions in the ankylosed joints, these seem to soften and may thus be broken up when dry heat is used.

REPORT OF CASES EXAMINED FOR THE N. J. H. FOR CONSUMPTIVES.

BY S. SIMON, A. B., M. D., DENVER, COLO.

It would probably not be out of place before giving the report of the cases examined for admission to the National Jewish Hospital for Consumptives during the past eighteen months to explain how this most worthy institution is conducted, and how admission thereto is obtained.

The hospital is entirely under Jewish lay management, and supported by the Jews throughout the United States. It is, however, non-sectarian as to the religion of the patient admitted. The institution is under the control of a national board of directors, consisting of thirty-five members, residing in the principal cities of this country. The immediate management is in the hands of a local board of managers, of whom there are eleven, assisted by a medical advistory board of three physicians. Among the rules governing the admission of patients the following is quoted: The National Jewish Hospital for Consumptives at Denver is intended for the treatment of tubercular diseases only among the indigent, in whom the disease is not sufficiently advanced to preclude the possibility of recovery or the arrest of the disease, within the time assigned for the treatment. Every applicant desiring admission to the hospital must have the indorsement of the local director, and be examined by a properly authorized physician of the city in which he lives, and the examination blank, together with the application, submitted to the Denver board for action. Upon arrival in Denver, he is at once admitted to the hospital, and re-examined by the admitting physician. Should the answers of the applicant be untrue, or the examination found incorrect, and in the opinon of the admitting physician hospital treatment not likely to prove beneficial, the applicant is returned to the place from which he came. A guarantee that the patient, when discharged, will not become a charge

on the city of Denver, signed by three responsible persons must accompany each application.

During the first six months of the hospital's existence a number of advanced cases of tuberculosis were admitted. These patients had been in Denver for some time, and there being plenty of room at the hospital, admission was readily granted, consequently a great number of deaths occurred at the hospital during the first year. Since then only those in the early stages of pulmonary tuberculosis, who are likely in the opinion of the admitting physician, to be improved by hospital treatment, have been admitted. Following upon the enforcement of this rule, the number of deaths has been materially decreased. During the first six months twelve patients died; during the second six months eight, and during the last five five and a half months three, making a total of twenty-three deaths.

At the present time every applicant who has resided in Denver for less than a year is referred to his former home city for indorsements of his application by the resident member of the national board. A patient who comes to Denver for the purpose of obtaining admission to the hospital, to avoid having his application go through the regular channels, will find it a difficult matter to gain entrance. During the past eighteen months 350 applications for admission were made, of which 228 were examined and 204 were admitted. One hundred and forty-six were rejected, either because they had relatives who could provide sufficient funds for their care, or because their condition was too far advanced, and for other reasons. Patients are admitted for a six month's term, which may be extended upon the recommendation of the medical advisory board, but no patient is permitted to remain longer than one year. Patients are examined every two months by the attending physicians to note their progress. Their sputa is examined upon admission and several times during their stay, and again upon discharge. Patients are weighed weekly to note gain or loss.

There were 174 males and 54 females examined; 130 were single, 92 married and six widowed. Thirty-one were between the ages of 10 and 20, 112 between 20 and 30, 56 between 30 and 40, 25 between 40 and 50 and three over 50.

All cases have been divided into four stages. Those showing slight involvement of one or both apices—that is, some dullness, increased fremitus and prolonged expiration, without rales, are classed as incipient. Those cases in which the physical signs are somewhat more pronounced, and where rales are heard, are classed as first stage. Those cases in which there is marked consolidation, and beginning softening with numerous moist rales, are classed as second stage, and those cases in which softening is marked, and cavities are in process of forming or have formed, are classed in the third stage. Such a classification, it will be understood, is more or less arbitrary and often difficult to make, as there are no distinct dividing lines between the ending of one stage and the beginning of the next. Where the examiner was in doubt how to classify a case, he was assisted in coming to a decision by the patient's general aspect and the rational symptoms.

Of the 228 cases examined, 25 were found to be in the incipent stage, nine of whom had the apices of both lungs involved, 14 had the apex of the right lung and two the apex of the left lung. Twenty-four of the incipient cases were decidedly improved by hospital treatment, and one, a woman, died; she had slight tubercular infiltration of the larynx, and was also four months pregnant at the time of her admission. After her delivery of a seven and a half months child, her lungs and larynx grew rapidly worse, and she died within four months of her accouchement.

Forty-two were in the first stage of tuberculosis, and of these five had the upper lobe of the right lung and apex of the left lung involved. Seven had the left lung and apex of the right, 12 had both lungs almost equally and 17 had the upper lobe of the right lung alone, and one the upper lobe of the left lung alone involved. Of the first stage cases 33 were improved, eight remained stationary and one died.

Eighty two of those admitted were in the second stage, and 26 had the right lung more extensively involved than the left, nine the left more than the right, 14 had both lungs equally and 23 had the right lung alone, while 10 had the left lung alone

involved. Of the second stage cases 54 were improved, 17 were unimproved, eight became worse and three died.

Forty-three of those admitted were in the third stage, five being in a fibroid condition. Of these eight had the right lung more extensively involved than the left, 16 the left more than the right, eight both lungs equally, six the right lung alone and five the left lung alone. Of the third stage cases 10 were improved, 12 unimproved, six worse and 15 died.

Of the 24 not admitted, 18 were too far advanced, two were not tubercular, four the physical signs were too indefinite or slight. There were also four cases of miliary tuberculosis admitted, three of whom became worse and one died. And three cases of phthisis florida were admitted, of whom one became worse and two died. Two were admitted in whom the physical signs were indeterminate. Both were discharged improved. Two were admitted and afterwards found to be non-tubercular, and were discharged.

Summing up the totals we find that out of the 204 cases admitted in the hospital 125 were improved, 39 were unimproved, 17 became worse and 23 died.

One feature that invites attention is the predominance of right lung involvment over that of the left; in the incipient cases the ratio was seven to one, in the first stage 17 to one, in the second stage two and a half to one and in the third stage cases six to five.

Many of the cases marked improved were practically cured when discharged, but sufficient time had not elapsed from the disappearance of all symptoms of the disease to warrant one in pronouncing them well or cured. Nearly 90 per cent of those discharged still live in Denver and vicinity, and while not under direct observation are frequently seen, and the majority of these report themselves continuing well and able to work. It is the intention of the hospital authorities to devise some means of keeping patients under observation after their discharge, in order that the statistics in the future may determine the number of permanent cures obtained. In recommending the discharge of patients from the hospital, the attending physicians are guided by the improvement that has taken place in the patient's general

condition, such as gain in weight, healthy appearance, as well as the disappearance of all marked pathologic signs in the lungs and the tubercular bacilli from the sputum.

Colds contracted in exposure from their work, was assigned as a direct couse by 83 patients. La grippe was given as the cause by 24. Six had slept with some member of the family who had tuberculosis. Forty-five gave various other causes, and the remainder assigned no definite cause.

The occupations of the patients were exceedingly varied, 74 different ones being given. Forty-five were employed as tailors or allied work, 28 were employed in stores as salespeople or clerks, 23 in housework, 14 peddlers, eight cigarmakers, six laborers and six school children. The largest number, it will be noted, were employed as tailors, most of them in the sweatshops of New York City and Chicago. This certainly justified the authorities in taking cognizance of this evil, as was done by the Legislature of New York State and the health boards in enforcing certain hygienic and sanitary rules in the tenements, where these people live and work. The next highest number, employed as clerks or salespeople in stores, would indicate that here, too, health boards might find a field for investigation and improvement. Nearly all those engaged in housework were women, most of them as wives of households and at the same time assistants to their husbands in their work. The peddlers, a large proportion handling old clothes and rags, form the next most numerous class. If one were to deduce anything from these figures it would be the influence of indoor work and bad hygiene as contributing to produce tuberculosis.

The family history in 152 cases was negative. In two both parents had been affected with tuberculosis, in 22 either one parent or the other had been affected, and in eight one or more brothers or sisters had tuberculosis, in 15 cases some paternal or maternal relative had been affected, in two cases wives of the patients had been affected and in one the husband. I cannot help but nothing here how small a part, if any, heredity plays in causing tuberculosis. Many of the patients examined for the hospital, as well as those in private pratice, express their surprise that they should be affected with tuberculosis, since no mem-

ber of the family had ever had it. Long years of the establishment of the belief that consumption is hereditary has left a deep impress upon the minds of laity as well as the profession, which will require time to efface.

Among the important symptoms noted, hemorrhages were present in 98 patients and the spitting of blood on one or more occasions in 23 patients. One hundred and seven had not coughed up any blood during the course of their illness. One hundred and twenty-one patients had night sweats, in 64 of whom they ceased on coming to Colorado. Ninety-two had never had any.

Seventy-five per cent of the patients had fever, varying from one-half to four degrees, which occurred mostly in the afternoon. A rapid pulse even without fever seems to be almost the universal rule.

The microscopic examinations of the sputa show tubercular bacilli present in 166 cases and absent in 33. There was no report of the remainder.

I shall briefly touch upon the treatment of the patients at the hospital. The climate, nutritious food and personal hygiene were mainly relied upon. Patients are encouraged to keep out of doors as much as possible, and to further this purpose games are provided for their amusement upon the porches and grounds surrounding the hospital. The food provided is the best the market affords, and is properly prepared. There are a number of special diets upon which patients may be placed, as directed by the attending physician, besides numerous extras, which may be ordered for the patients. It has been the aim of the staff to give particular attention to the quality and preparation of the food provided for the patients, and in this it has found the ready co-operation of the board of managers.

All patients are instructed in the danger that lies in communicating the disease through the sputa, and paper spit-boxes are provided for them, which they are required to carry with them in and around the hospital. They are not allowed to expectorate in or use handkerchiefs. Pieces of cheese-cloth, which can be cremated, are provided for their use. Various other measures to secure personal cleanliness are enforced. In regard to medication, no systematic attempt has as yet been made to

use true specific medicines. Patients are treated symptomatically, and the majority of the attending physicians avoid the use of large numbers of drugs.

It has been found that the fever in this disease is best combatted by putting the patient to bed. One patient was kept in bed almost constantly for four months before his afternoon rise of temperature ceased. In treating excessive coughs, heroin is the drug most frequently employed.

I desire to acknowledge my indebtedness to Dr. John Elsner and the other members of the staff for the use of their reports of the cases examined by them; to Dr. Philip Hillhowitz for the microscopic examination of the sputa; to Dr. M. Collins, superintendent of the hospital, for such other data required in making this report.

A CASE OF TYPHOID FEVER WITH GREATLY ENLARGED LIVER AND HEMORRHAGES FROM THE BOWEL.

BY ALFRED MANN, M. D., DENVER, COLO.

On the 19th of November, 1900, Raymond J. was brought to my office suffering apparently from acute follicular tonsillitis; the patient was a boy of 14, small for his age, pale and delicate in appearance. There was a moderate fever and a pulse of about 110. He was sent to bed. The fever and malaise increased, the temperature reaching 104 degrees on November 25. By this time an enlarged spleen could be palpated, and it was evident that the pharyngitis, which now was almost over, had been merely a symptom of the onset of typhoid fever. The patient was sent to St. Joseph's Hospital and put on liquid diet. Two or three days later a typical, rather profuse reseola developed and the usual course of a typhoid of moderate severity followed.

During the first week there was no marked enlargement of the area of liver dullness. At about the end of the third week

the lower border of the liver could be easily palpated just above the level of the umbilicus. During this week there occurred an acute catarrh of the intestine, as well as a light attack of bronchitis. Early in the fourth week, when the daily afternoon temperature was about 102°, a small hemorrhage from the bowel, of about three ounces, occurred. Two days later the temperature for the first time reached normal. At this time, and for many weeks afterward, percussion showed the liver extending from the sixth rib in the mammillary line to an inch and more below the crest of the ilium. Its lower edge could be easily palpated where it extended across the abdomen, beginning below the anterior superior spine and passing below the navel and then steeply upward and slightly to the left. Percussion showed the upper limit of dullness in its normal position. There was at no time icterus, neither was there any pain or sensitiveness in the region of the liver.

On December 19, after the temperature had been normal for two days, another hemorrhage from the bowel of four ounces was noted. The same day the temperature commenced going up, and two days later it reached 104°. A typical relapse had set in, the spleen being again palpable, and a very copious rash also appeared all over the patient's trunk and limbs, a few even being found on the face. In the original attack, as well as in the relapse, the rose spots appeared in successive crops, so that he was hardly ever entirely free from them.

On the fifth day of the relapse, when the temperature was above 104 and the pulse 140, a third hemorrhage from the bowel occurred, the largest of the three. The patient passed 27 ounces of blood, and a sharp collapse followed. Two pints of normal salt solution were at once infused under the skin of the chest. The foot of the bed was raised about 15 inches. A few hours later the temperature was 105½, and the pulse could be counted only by the stethoscope at 190. Infusions of a pint of salt solution followed every 12 hours, and high rectal enemata of holt salt solution were adminstered. The high temperatures were controlled by sponging with ice water and by rubbing with ice. Ice bags were almost constantly kept on the chest and abdomen. Stimulants and concentrated foods were freely used.

After six days of imminent danger the temperature and pulse began slowly to drop, and in another week the temperature was normal and the pulse remained between 100 and 110.

A normal convalescence followed, but the edge of the liver could be palpated just above the umbilicus for more than two months after the cessation of the fever. Two months later still I learned, through the kindness of Dr. H. H. Weist, of Richmond, Ind., where the patient now is, that examination showed the liver to be normal in size and that recovery was complete.

Whether there was any causal relation between this excessive enlargement of the liver and the hemorrhages that occurred in the fourth, fifth and sixth weeks of the disease I am unable to say. The immediate effect of prompt and copious hypodermic infusion of saline solution in saving life after severe hemorrhage was again demonstrated.

THE LATE EPIDEMIC OF TYPHOID FEVER IN FORT COLLINS, COLORADO.

BY P. J. M'HUGH, M. D., FORT COLLINS, COLO.

In writing up the epidemic of typhoid fever which occurred in Fort Collins last fall it is needless to say that absolute accuracy in considering the various symptoms, complications, etc., can hardly be expected. It is only in well regulated hospitals, where careful records are kept, that this can be done. In a general way, therefore, I shall have to depend on my memory for most of the data referred to in this paper, except in cases where trained nurses were employed.

During the latter part of October, 1900, and up to the 18th day of November following, quite a few cases of typhoid fever occurred in Fort Collins and vicinity. The outbreak, which I refer to as the epidemic, however, did not occur until the 18th day

of the latter month. On this day cases of typhoid fever began to come down with appalling rapidity. This continued until the 25th, when my business was increased to "no rest" proportions. All the physicians in the city were working by this time day and night. I should judge that 95 per cent. of the total number of cases fell sick between the 18th and the 25th of November. Those who came down afterwards, with but few exceptions, were nurses or members of families who contracted the disease from their patients or sick relatives. It is impossible to be accurate as to the total number sick, but the general concensus of opinion, among the townspeople and physicians, place it at 300. Of these the larger proportion were between the ages of 7 and 25 years. The extremes of life were, as a rule, spared. Few cases occurred below 7 or above 50 years of age. Between these ages males and females were sick in about equal proportions. From the age of 25 years and upward a gradual decrease in the number sick was manifest. A noticeable fact, however, was the better to do classes seemed to have the disease in its severest form. It was general all over the city, except in the northern and eastern portions, which lie along the river, both of which might be regarded as the least healthy, on account of the lowness of the land. Few cases occurred in the hotels, but in private boarding houses a large number of college students fell victims to the infection. With few exceptions the disease was confined to the city; in previous years the country furnished the greater number of cases, in proportion to the population.

As victim after victim was sticken down, and the disease in many prominent homes began to take on a malignant form, the inhabitants became almost panic stricken; they recalled the fact that nothing like it, in severity, ever occurred in our city before. Typhoid fever, for a number of years previous to this outbreak, had dealt mildly with the inhabitants of the Poudre valley. True, it was a few deaths occurred from it from year to year, but the percentage of cases compared with the population had been small, and the percentage of death unusually low. Every means possible was taken by the inhabitants to evade the disease after the first day's sick list was recorded. The water and milk were sterilized by boiling; the butter was made into an unpalatable

mass by the same process. Patent nostrums, sold by enterprising druggists at a profitable price, were freely partaken of by a goodly number, and many hungry bacteria were mercilessly swept through the alimentary canal by those who believed in "physic" as a preventive. Celery underwent a rigid process of cleaning before it was allowed to enter the stomach of many individuals. I am told that one physician used a sterile toothbrush for this purpose. Armed with a non-poisonous antiseptic solution, and aided by a powerful magnifying lens, the toothbrush was made to go over the celery from root to foliage and lay waste and dead (?) any typhoid bacillus that might perchance have nestled upon this palatable vegetable.

The charges of municipal neglect were numerous. The Mayor of the city received his full share of criticism for the prominent part he was supposed to have played in the ill-management of the water supply. The chairman of the board of waterworks was charged with incompetency and as being essentially derelict in the discharge of his duties by prominent citizens, men who, after the epidemic had passed by and the cemetery had absorbed the flower of our young sons and daughters, fought a proposition of extending our water system to a point on the river, that was thought by many, would practically guarantee against subsequent epidemics of a like kind. Business for a period of at least three weeks was practically suspended. In the home of almost every business man one to three persons were sick, and the farming community was so fearful of contracting the disease that few of them came to town. The wildest and most exaggerated reports were conveyed from one family among them to another, and thus the panic was extended to the widest limits among those who did their marketing at Fort Collins. In the stores and shops the disease was discussed from every conceivable standpoint. Each individual knew exactly how serious was his neighbor and the plan of treatment adopted by the attending physician. This and that physician's treatment was criticized without hesitation or limitation. The cold bath treatment received its full share of disapprobation; and woe to the physician who dared to use ice on a fever-stricken individual! The placing of an ice cap on the head for any purpose, or on the abdomen to control a hemor-

rhage, was by these would-be *connisseurs* of the medical art construed as packing the individual in ice and so reported. It is only fair to say, however, that in the homes the physician's word was held in the highest respect. For my own part, and I believe it was general with the profession, I shall always remember with pride the confidence that was imposed in me by families in whose employ I was, and in passing, let me say that this confidence is the higest stimulus for us to be true, loyal and efficient physicians.

In estimating the cost of this epidemic, I quote from a very valuable paper, read before the Science Club of the State Agricultural College, by Prof. Carpenter, in which he says:

"Let us examine the cost due to the fever of the past few months. There have been, we will say, 350 cases of fever. Each case has caused an extra expense for nurses, doctor bills, drugs, washing, even extra coal and extra light has been no inconsiderable item; for those who have recovered it is safe to say the sickness has cost in cash, on the average, at least $200, and those who have not recovered at least $350.

"This makes 310 cases at $200, $62,000; 35 deaths at $350, $12,000, or say a cash outlay of $70,000. Now, in addition, there has been a loss of time. Some extensive hospital records show 43 days as the period of convalescence. This is the discharge from the hospital, and does not include the time when the convalescent has not regained his full strength, which many know from experience may extend over a number of months, or even years. What shall we consider this? Most of those attacked are in the prime of life. We may count their average earning capacity at $1 per day; the loss on 360 cases is, then, about $16,000. These items, the cash cost and loss of time mean a direct cash loss to the community of $86,000.

"But this does not include all. We are considering only dollars and cents, not attempting to weigh the sorrow and anxiety of those whose households have been stricken.

"A human life may be considered an asset of a community. The French count every soldier worth $1,200. The courts often consider it as worth $4,000 to $5,000. We may take an intermediate value of, say $2,500. This means, then, for 35 lives sacrificed—35 times $2,500 equals $87,000 loss to the community.

"Now, beyond all this, there are indirect losses to a cummunity; the draft on the time and strength of others of the household has not been considered, for this has not been a cash outlay. In many cases it has been a draft sufficient to lower the vitality and perhaps shorten the life of the anxious relatives.

"Every piece of property is less in demand. Business transactions are lessened, causing a loss none the less real, though indirect and difficult to estimate. At the lowest possible estimate this means, all told, a loss to the individuals and the community of over $200,000 for this one epidemic. And who shall estimate the anxiety and sleepless nights of the husbands and wives, the fathers and mothers, whose households have been stricken, or place the money value on the tears of those who mourn?"

In seeking the cause of the epidemic, I shall make reference to the very able report of Dr. W. C. Mitchell's investigation. It is needless to say before this society that typhoid fever depends on the presence of Eberth's bacillus.

About the 1st day of December, 1900, Dr. W. C. Mitchell was employed by the Board of Health of the City of Fort Collins to make an investigation into the cause of the epidemic. After a very creditable and searching investigation into the sanitary conditions of the city and the Poudre river, and a bacteriological analysis of samples of water taken from different points along the river and from water taps in town, he arrived at the following conclusions as per his summary:

"Both the sanitary inspection and the bacteriological analysis show that the water supply of Fort Collins is subject to the present time to a continuous contamination by the fecal evacuations of both man and animals, and that, moreover, there is no adequate barrier to remove this contamination from the water before it reaches the consumer.

"The present epidemic can, in the opinion of your expert, be traced directly to the cases of typhoid fever which existed in Bellevue, and the evacuations of one of which has been clearly shown to have been emptied into the Poudre river at this town.

"It was also reported to me that there were three cases of typhoid fever on the North fork of the Poudre, but this is only hearsay. But it can readily be seen that there may at all times

be other sources of infection. I am informed by Dr. Killgore that there is hardly a month goes by but that there is one or two cases of typhoid fever present.

"In reference to the present epidemic, there is another feature which points to the water as being the carrier of the germs, and that is both the suddeness and the extent of the cases of fever. Then, also, the time could not correspond more accurately. The emptying of the discharges into the water the first or second week in November and the disease two weeks later in Fort Collins."

The case referred to in this summary was one Weir, of Bellevue, who took sick with typhoid fever on the 3d of November, 1900, and continued sick until the 24th of November, according to Dr. Mitchell. Bellevue is a town on the Poudre, about seven miles above Fort Collins. The discharges from the bowels of the above patient, instead of being disinfected, according to the attending physician's orders, were thrown into a ditch which empties its contents into the Poudre river. Allowing "eight days" (Hiss) as the time at which the bacilli would first be discharged from the bowels of this patient, two days for their conveyance to Fort Collins and fourteen days as the period of incubation, the epidemic should not have occurred until the 27th of November. It did, however, occur on the 18th, or nine days before it was likely to occur, if the infection was from this source. The virulency of the poison might account for a shorter period of incubation than fourteen days, but the clinical history of many of these cases does not justify the assumption that it was less than this time. In fact, I am sure, the period of incubation was at least two weeks, and in some cases longer, as I had a number of cases suffering from the prodromes of the fever for this length of time, and who took to their beds on dates between the 18th and 25th of the month. Among them was a druggist's wife and my own wife. They suffered from symptoms almost identical—severe pain in the head and back, with marked lassitude, etc. They came down simultaneously on the 25th of November. Again, patient Weir was sick for 21 days. Should the discharges from his bowels and bladder be deposited in said ditch, from day to day, up to the end of his sickness, and most likely they were, as we have no information that they were not, new cases should con-

tinue to come down in Fort Collins for a period of at least 13 days. The facts, however, are, they ceased to come down after seven days, save in a few scattering cases.

It is, therefore, very conclusive to my mind that this particular case was not the cause of the epidemic. Such being so, who will say that it was caused by the water supply, when a second epidemic of more or less severity, was not produced by the direct contagion of the river, by the discharges from said patient Weir, and which should have occurred on the 27th?

What, then, was the source of infection? If it were caused through the water supply, it would seem that the hotels, where unboiled water was drunk ad libitum, would furnish at least some percentage of the cases. This they failed to do. As previously stated, the inhabitants living in the northern and eastern portions of the city, where the sanitary conditions are the poorest and the means of the people the most limited, were practically exempt. Those more able to afford the luxuries of life were the ones principally afflicted. Might not this suggest that the food supply was the source of the infection? Calay has collected a number of instances in which typhoid fever occurred from poisoned meat. This, of course, would not necessarily exempt the water supply, as the meat might, without question, be contaminated by it.

Numerous epidemics have occurred in which no outside source could be found for their origin. An instance of this kind is reported from the Military Academy of Chelsea, Pa., in which 14 cases developed among 132 students. After a thorough investigation by Dr. Billings, no source could be found for the infection.

Murchison and other writers of note have contended that cases may develop independently of pre-existing cases of typhoid fever; and it has been suggested that the bacillus occurs in nature, possibly in an imperfect state of development, and under certain conditions takes a prothogenic power which enables it to produce the disease in susceptible individuals.

In this instance might it not, through contact with the results of some unknown decomposing organic matter, have acquired this power, and might not the long continued dry season

(little rain having fallen from July to December) have so reduced the resisting power of individuals as to make them susceptible to the disease. And I might suggest further, with Baumgarten, that the dust of this unusually dry season may have disseminated the germs and the bacillus entered the system with the inspired air. We do not need to go outside of Colorado to find physicians who seem to entertain the idea that typhoid fever is an eminently infectious disease. Among these is Dr. T. A. Hughes, head examining physician, Pacific Jurisdiction, Woodmen of the World. In his April, 1901, report to the head officers of that order he says: "Typhoid fever and pneumonia have each claimed an equal number of victims. Both diseases have been extremely prevalent in our jurisdiction during the last six months; the community at large, as well as our order, have recorded many deaths from these causes. I might almost say that a wave of typhoid fever and pneumonia, following la grippe, have swept over our country from the Atlantic to the Pacific, no state or community having escaped, as shown by the health reports of our cities."

In speculating on the source of the infection, I have no desire to minimize the dangers to the public from the polution of streams that supply towns and cities with water; but I do believe that water supplies are not the sole source of infections which produce typhoid epidemics. We have abundance of statistics to show that a rapid reduction in the number of cases of typhoid fever has been effected annually by good filter systems, but we also know that such reduction will be apparent without the assistance of filters. Nine years ago we had in Fort Collins a large number of typhoid fever cases; my own cases numbered 66 in that year alone. Since then there has been a gradual annual decrease in the number until the occurrence of the present epidemic. The filters at the waterworks, according to Dr. Mitchell's report, could not influence this result, and to my own knowledge they are incapable of filtering out bacteria from water. At any rate, they were put in but five years ago, and the reduction in the number of cases had been going on annually for four years previously. Twenty years ago we had a similar outbreak and a decreased annual number of cases for the following 10 years. Does not

this suggest that immunity, both acquired and hereditary, plays a great part in the occurrence of epidemics of typhoid fever? It is not necessary that an individual should have an actual run of typhoid fever or any other contagious disease to acquire immunity. It may be conferred on some persons by the reception into the system of a limited amount of poison, but not enough to produce actual disease. Twenty years ago all or a large percentage of the community was rendered immune by actual disease or by semi-intoxication. This immunity would seem to have lasted for the following 10 or 11 years, when another epidemic, though mild in character, occurred. Immunity was again conferred, and this lasted until the recent epidemic.

The discovery of the bacillus coli communis in the water supply of Fort Collins by Dr. Mitchell is very suggestive. The presence of intestinal bacteria in drinking water is satisfactory evidence of pollution by fecal matter of man or animals, and strongly points to the possibility of contamination by typhoid germs, and whether the epidemic was caused through the water supply or not no time should be lost in securing a supply that will be free from such untoward contamination.

In describing the clinical manifestations of the epidemic, I have already said that I believe the period of incubation was from two to three weeks. The time at which the fever began, however, was well marked and decisive in most cases. In children the premonitory symptoms were headache, usually occipital, loss of appetite, coated tongue with red edges, colicy pains in bowels and general indisposition. Often a hacking cough accompanied these symptoms.

The fever did not run high, except in the cases of those who were managed badly or had imposed on them improper food. In some the temperature was highest at the outset of the disease, until the end of the second week, when it declined by rapid lysis. In the majority the rise was gradual, attaining its maximum at the end of the first week and declining gradually the third week of the disease. Still, others had practically no fever, the diagnosis resting on their apathy, loss of appetite, coated tongue and presence of mucous in the fecal discharges. Out of the total number of children I treated, up to the age of 15 years, but 21 per

cent had symptoms calling for urgent treatment. In those the temperature ran very high, stupor, derilium, tympanites and sordes were all present. The history of one of these may be of interest. Child B, age 7½ years, was taken sick on the 24th of November, 1900; came home from school, complaining of headache, but played some; had diarrhœa for the first week, afterwards constipated. On the 6th day of the fever the mental condition changed from apathy to marked stupor, which endured until convalescence was well on way. From the beginning of the stupor he never articulated until the end of the fifth week of his sickness. Emaciation was extreme; cutaneous hyper asthesia was well marked and general all over the body; the muscles of the back and neck were painful, and on moving the arms and limbs the child would cry out with pain. As the disease progressed the stupor became more extreme. It required great effort on the part of the attendant to arouse him sufficiently to take food; the tongue early became dry and covered with a brown crust; the abdomen was distended; the legs flexed on the abdomen and the face presented a pitiable picture of distress; the pulse was extremely rapid and weak and required constant stimulation. It was almost impossible to keep the child off its back, and as a consequence hypostasis had to be fought continually. He had as complications and sequelæ deafness, suppurative otitis media, falling of the hair, marked slowness of speech, mental weakness and poor memory.

The epidemic presented examples of almost every type of the disease known, the afrebile and ambulatory forms excepted. There was the "mild," the "grave," the "cerebro-spinal and hemorrhagic," the "gastric or bilious," the "adynamic," the "sudoral," the "abdominal and thoracic," the "typho-marial," and lastly the "intensely malignant or fulmanant" form. From year to year, for the last 10 years of my practice in this locality, it has not been unusual to have cases of ambulatory or walking typhoid fever. In this epidemic, however, such cases were noted for their absence, except in a few children under 10 years of age, who, however, were not allowed to walk about. In other years patients have walked about and recovered without any complications or sequelae, save emaciation and general weakness, but in

this epidemic no trifling escaped its punishment. It seemed utterly impossible to deviate from the simplest rules governing the treatment of typhoid fever cases without aggravating the disease and thereby prolonging its course. Another feature was especially noticeable—out of a mild type of the disease any of the forms mentioned might, in the midst of the most hopeful prognosis, suddenly develop and cause it to prove exasperatingly intractable.

Typhoid fever is now, and always has been, a treacherous disease, full of many pitfalls in the way of complications and sequelae, but this epidemic was unusually so. The hemorrhagic type of the severer forms was very prevalent. In this class I include those cases who had hemorrhages from the bowels, as well as from the ears, nose, mouth and mucous membranes in general. Fifteen per cent of my cases had hemorrhages from the bowels; of these 5 per cent were children under 15 years of age.

One case I saw in consultation, and another went to her home in Denver and died of violent hemorrhages at the end of the second week. The one I saw in consultation was a child of 5½ years of age. She had a violent type of the disease, marked by active and continuous maniacal delirium, abdominal pain and tympanitis, dry tongue, high temperature and rapid pulse. At the end of the fourth week of her sickness a violent hemorrhage came on. Five minutes after the hemorrhage began she died. The whole contents of the vascular system poured out of her body in one heap, completely exsanguinating her. The balance survived the hemorrhages, and all but one recovered. This one subsequently died of unilateral labor pneumonia. The hemorrhages were characterized by profuseness and early occurrence. They were accompanied by a pronounced fall of temperature, which seldom arose to any considerable height until convalescence or death ended the scene.

Thirty-three per cent had delirium. The character of it differed from a more or less mild type to a wild maniacal type. The low muttering type was present in 15 per cent of cases in children. Ten per cent had severe tremors, accompanied with great restlessness, and 10 per cent had the wild type of delirium. In adults the "low muttering" form predominated. It came on usually about the end of the second week and lasted until con-

valescence. It was not unusual, however, to find it present as early as the end of the first week of the disease. Intestinal flatulence was the rule, and marked abdominal gaseous distention occurred in 18 per cent of all my cases. It was one of the most troublesome symptoms. It occurred in the constipated form as well as in the diarrhoeic form. It was extremely troublesome to one patient, who had organic heart disease, and caused an increase in the rapidity of the pulse and respirations in mostly all cases. In one child the heart always became irregular, under excessive distention. Colonic flushing, with or without turpentine, or the introduction of the rectal tube, invariably relieved this symptom. A gut distended with gas favors hemorrhages, deep ulceration, perforation and a freer absorption of decomposed products and toxines from the intestinal canal. Enteralgias, from direct pressure of the distended gut on the greater and lesser splanchinic nerves, were common, and in this abnormal condition we have a satisfactory explanation of the vasa-motor disturbances that accompany this disease.

Constipation was the rule all through the disease. A small percentage of cases began with a characteristic diarrhoea, which continued for the first week. This was followed by constipation. One adult patient had a troublesome diarrhoea, consisting of watery discharges all through his sickness. The initial manifestations began in the larynx and pharynx. The temperature did not run high, but the throat difficulties continued without interruption. Thick tenacious secretions, which were exceedingly hard to remove, formed therein. Those in the naso pharynx underwent decomposition and imparted to the breath the most sickening odor. At the end of the second week the bowels became enormously distended with gas; the intestinal discharges were exceedingly offensive. It was absolutely impossible to change their character, and even with frequent colonic flushing, antiseptics, etc., the odor, watery stools and tympanites continued until his death, the sixth week of the disease.

In these cases the shortest duration of temperature was 14 days, the longest 49 days. The curve, as a rule, was not characteristic of typhoid fever, except in a few cases. One of these was Mrs. A. W., whose temperature chart I exhibit. It shows two

recurrences of the fever, one on the 22d day of the disease and one on the 33d. Her case presented an uncomplicated one up to the 35th day, when phlebitis of the femoral vein set in. Possibly the rise in temperature on the 35th day was due to the advent of the phlebitis, and not to a recurrence; at any rate, it marked the beginning of the end. Stupor, which day by day gradually deepened into coma and coma vigil, accompanied this last thermometric curve, and she died of exhaustion 10 days later.

Hyperpyraxia was not the rule. The highest temperature in any of my cases was 105.6°, the lowest 96.2°. A sudden fall in temperature was rare, except in the case of hemorrhages. The pulse was rapid, as a rule. In the case of Mrs. A. W., already referred to, it was found on only two occasions below 100°; the last 10 days of her sickness it ranged from 120° to 160°. In the case of a boy of 15 years, who had a recurrence of the disease, the heart, during the whole period of the recurrent attack, had to be vigorously supported. On the day of the recurrence the pulse went rapidly up to 124°. Except for the absence of an endocardial murmur, a diagnosis of malignant endocarditis might easily be made. On the 12th day following a pulse of 160° was reached. It ranged between 136° and 160° for the following nine days, when it suddenly dropped to 78°, after a sponge bath. The highest temperature recorded during this time was 102.8°, the lowest 98°.

In five children and two female adults cutaneous hyperasthesia was marked. The slightest touch would create great suffering. This condition was usually accompanied by clonic spasms of different groups of muscles. In one case great rigidity of the arms, limbs and spine were present. The upper arms were forceably drawn to the sides, and the forearms and hands across the chest. They could not be removed without the exercise of great force, and any attempt at doing so would elicit the most pitiful cries of suffering. There was a fixed ecstatic expression of the face and a rigid condition of the muscles of the neck. The tendon reflexes were normal, the pupils responded to light and opisthotomus was absent. Bronchial cough was present in the early stages in nearly all cases.

Fully 25 per cent had marked catarrh and hypostatic congestion of the lungs, 5 per cent had labor pneumonia and 3 1-3 per cent had fecal impaction low down in the rectum. One case had peritonitis, one a gluteal abscess and one necrosis of the nasal septum, followed by perforation.

As a result of the epidemic, 37 deaths were recorded. Of these nine were children under the age of 15 years, five males and four females. Two were below the age of 5 years. Twenty-eight were adults, 14 males and 14 females. Of these, five males and five females, were above the age of 25 and below 50 years.

SOME NOTES ON RESECTION OF THE RIBS IN EMPYEMA.

ANDREW STEWART LOBINGIER, A. B., M. D., DENVER, COLO.

The management of effusion into the thorax will depend much upon the character and extent of the inflammatory process which produces it.

Netter has shown that in children empyema is of tuberculous origin in 25 per cent of all cases. The other 75 per cent is due principally to the pneumococcus, with the staphylococcus streptococcus, Eberth and colon bacillus as occasional sources of infection. In adults Netter and Eichorst have found from 65 per cent to 69 per cent of tuberculous origin.

It is generally recognized that empyema resulting from tubercular pleurisy has a much less favorable prognosis than when of pneumococcus infection. The latter cases are attended by a less stable proliferate, and the lung is left more patent and resilient than it is in tuberculosis. A very small percentage of empyema cases are permanently cured by aspiration alone. Da Costa believes the cures to be limited chiefly to post-pneumonic effusions in children, and declares pointedly that "aspiration is not to be considered a method of curative treatment in empyema." In very young tubercular subjects of progressive type Lock-

wood prefers aspiration, and regards it the surgical measure of election in these cases. In fact, it is the experience of most operators that extensive resection in young tubercular subjects of florid type is not attended with sufficiently favorable results to justify the hazard of such a radical measure.

In operable cases of empyema of long standing, where the pleura is greatly thickened, nothing but extensive resection of the ribs should be undertaken. The delay, so common in these cases, can offer no possible hope for the patient, and only endangers his life from amyloid degeneration of the liver, spleen and kidneys.

There is a plain principle involved in the operation for empyema which underlies the argument for radical interference, and must not be lost sight of in the consideration of every chronic case. The principle consists, not in evacuation, not in drainage simply, but in the obliteration of an abscess cavity, whose wall is bony and resisting.

This may be done either by releasing the lung (if still resilient,) which is bound down by a thickened pleura, as De Lorme has advised; or if this be not possible, on account of atrophy, tubercular consolidation or fibrous contraction, then collapse of the thoracic wall may be effected by some modification of Quenu's, Estlander's or Schede's method. It is evident that the choice of operation must be governed largely by the pathologic condition in each individual case, the long-standing cases with large cavities calling for more extensive resection than those of briefer duration.

Resection of the ribs in empyema was first advocated by Warren Stone, of New Orleans. Since his day a great variety of technique has been employed, but underlying each method has been the principle heretofore enunciated.

Every patient presenting himself for operation should have the urine carefully examined for evidences of amyloid degeneration. As much time as the condition of the patient will permit should be devoted to preparation for the shock which commonly attends thoracic surgery in depleted subjects. If a thoracotomy has previously been done, the usual preliminary

withdrawal of the greater portion of the pus will, of course, not be required.

I am in the habit of waiting a week after tapping before proceeding with the resection. This affords time for the displaced heart to acquire something near its normal position and for the patient to gain resistance.

The heart should be supported by strychnia for a fortnight preceding operation. Saline enemata, a litre in amount, repeated every six hous for a week, does much to steady a feeble and rapid heart, and has proved in my hands a very positive aid in the preparation of the patient.

On the table strychnia should be used freely before, during and after the operation, together with subcutaneous transfusion of warm salt solution, should the pulse require it. No practical measure to successfully combat shock should be omitted.

The principle of obliteration of the pus cavity is somewhat that of the contraction of a hollow sphere. Hence the widest resection should be in a plane crossing the center of the sixth rib, and should not go higher than the second nor lower than the ninth rib. It has been my observation that the ninth rib is best left undisturbed, and that whenever a pocket is left unobliterated it is commonly found to be near the apex and next to the axilla. The U-shaped flap of Schede is much to be preferred to the straight incision of Pearce Gould or the intercostal incision of Estlander. Schede's flap was designed to be followed by the total excision of the ribs and muscles, from the angle posteriorly to the cartilages anteriorly. But this technique may be so modified as to include an elipse, the transverse diameter of which will measure six or eight inches, exsecting rib and periosteum and leaving the costal muscles and parietal pleura. With this modification it becomes necessary to curette the thickened parietal pleura as well as that over the lung, in order to obtain union when the two surfaces are coapted. The procedure advocated by De Lorme, whereby the thickened pleura is torn away from the lung, and the latter allowed to expand, is theoretically ideal; but it is adapted only to the simple and more recent cases where the lung is merely bound down and and not extensively atrophied or consolidated. It is

a procedure attended by considerable danger, and Kiliani reports the case of a little girl, nine years old, on whom he operated, who bled profusely through the month and nose from laceration of the lung in tearing away the densely adherent pleura.

Perhaps no feature in the operation and after-treatment of empyema has been more widely discussed than that of irrigation. At present the majority of operators are opposed to irrigating, either before or after the resection. Schede has always opposed it. A few very reputable surgeons have limited washing out the throax to the fetid class of cases and not repeated the irrigation after the resection. But there seems little reason for this distinction, and it may be confidently stated that an increasing number of surgeons believe irrigation to be a dangerous and needless measure.

Senn wipes the cavity dry with gauze sponges and finds in the more recent cases, this to be sufficiently erosive to clear away the lymph coagula and expose the capillaries, thus avoiding the curetting required in the older and denser deposits. In the latter class of cases, however, nothing short of deep and thorough denudation will answer. No islands of lymph deposit should be left behind, for such constitute one of the most potent causes of pockets and fistula, through which the discharge may persist.

Care should always be exercised to introduce the lightest possible gauze drain and to maintain perfect collapse and coaptation of the thoracic well with the lung surface. One of the commonest arguments against the use of irrigation, aside from the danger of syncope, is the hydrostatic distension it causes of the walls designed to be in collapse.

Scoliosis and drooping of the shoulder on the affected side have always seemed to me to be needlessly dwelt upon, and to constitute, in the average case, a very unimportant sequel to resection. I can recall no case where it was sufficiently marked to be worthy of comment, and much can be done after the wound has closed to correct, by proper muscular and respiratory exercises, the scaphoid condition which deflects the spine and drags the shoulder downward.

In conclusion, it may be well to emphasize certain well defined facts in connection with this review:

1. Cases for operation must be selected with much care and judgment, and without delaying for too frequent aspiration.

2. Progressive tubercular process in young subjects is a contraindication for anything more radical than simple thoracotomy and drainage.

3. Cases long delayed, until the organic pleura is dense and contracted, require free resection and are apt to be attended by greater deformity and loss of lung tissue than those resected earlier.

4. The periosteum must be completely removed, and the U-shaped flap affords the best covering for this, as it does for the lung in the original technique of Schede.

5. Irrigation is not at any time to be recommended. The cavity may be wiped dry both before and after curettement, with dry sterile gauze sponges, a light drain of iodoform gauze inserted, and a thick dressing of sterile gauze and cotton, under snug compression with adhesive strips placed over the resected area.

The after-treatment is that of any collapsed abscess cavity, drainage being abandoned as early as possible. Firm pressure over the collapsed area should be maintained, by properly applied dressings, until coaptation of the flap has been fully established and the sinus closed.

DISCUSSION.

Dr. Freeman: Dr. Lobingier has given us an excellent paper, in which I have been much interested. The most important thing in connection with an empyema is that the pus should be let out and drainage instituted as soon as possible, before the compressed and collapsed lung becomes hopelessly adherent in its abnormal position. All the more or less extensive resection operations are necessitated by a neglect of this precaution. The removal of a portion of rib in early operations for drainage is, I think, overestimated in its importance. It is often possible to get good results, as has been done undoubtedly by many men in this room, by means of a simple incision between the ribs.

As far as drainage is concerned, gauze is much inferior to rubber tubing. There should be two tubes of large calibre, one somewhat longer than the other and with holes in their sides. If one becomes closed the other will act. If the cavity extend far below the opening, at least one tube should extend to the bottom. It used to be taught that by the use of apparatus containing valves the pus could be forced out and a so-called negative pressure produced within the pleura, which would assist materially expansion of the lung and closure of the cavity. This idea, however, has been abandoned because leakage of air soon occurs between the edge of the wound and the tube. It is sufficient to employ a heavy dressing, tightly applied, which, when soaked with pus, has a valvular action of its own. In an acute case of empyema an extensive operation is usually unnecessary. It is enough to let out the pus and institute efficient drainage, as in any other abscess. I cannot believe that it is of such peramount importance just where the incision is made—whether it is high up, at a middle point, or low down, because the majority of patients spend most of their time in the horizontal position during convalescence. It is of importance, however, that the opening should be situated as far back as possible—near the posterior axillary line at least. I heartily agree with Dr. Lobingier when he says that extensive resection should be made rather early in the disease, before extensive thickening of the pleura occurs. After the pleura becomes thick and cartilaginous the chest will refuse to collapse, even if the ribs are removed over a large area, thus necessitating a Schede operation, which is more extensive and more dangerous.

In the Estlander operation a very large V should be removed—the larger the better—beginning high up in the axilla and extending to the lower border of the pleura.

I desire to emphasize the desirability of a wide opening in operating on acute cases—large enough to admit several fingers. Great chunks of fibrin, as big as a child's fist, are often present, and must have room to come out, or they will greatly prolong convalescence. The proceeding of Delangeniere has much to recommend it, theoretically. He removes a large portion of the ninth, eight and possibly seventh ribs anteriorly, making a great

opening into the pleura, through which the entire hand can be inserted for exploratory purposes. The wound is then closed around the drainage tubes and the most efficient drainage is obtained from the very bottom of the cavity, the removal of the ribs causing speedy closure of this usually troublesome area.

Dr. Hall: There is very little to say concerning the case, which speaks for itself. The one point of overwhelming importance in the treatment of empyema is to drain at once. The exact spot and the method are of minor note. About a year ago I saw a boy, with a chest full of pus, dying of amyloid disease, his attendants having feared to operate. During the winter we had at the County Hospital a death from empyema which was inexpressibly sad to me, for it was readily avoidable. A woman of 24 had been apirated twice some weeks apart, but no radical measures were taken for drainage of the chest, although pus was obtained. She was finally sent to the hospital, but just after arrival the pus broke into the bronchial tubes and she drowned in her own secretions. The house physician made the diagnosis at once, notified me, and Dr. Lyman resected a rib most expeditiously, but all in vain.

All must have noticed the abnormal frequency of empyema, especially of the para-pneumonic form, during the past winter.

Dr. Whitney: One point that I wish to make is that there are certain cases of empyema which ought not to be operated upon. I know that it is the general opinion that where there is pus it should be removed. There is a certain class of cases, however, where it is a great mistake to do a radical operation of any kind. I have in mind a recent case at the County Hospital. This man was simply aspirated, and to my knowledge was kept alive for two years, whereas, if he had been operated upon, death would probably have occurred much sooner. I wish to emphasize the fact that in tuberculous empyema the question of operation depends upon whether fever is present, and if present, whether it is due to the condition of the lungs or to the empyema itself.

Dr. Finney: There is one point which I wish to emphasize in regard to the use of anaesthetics in these cases. In speak-

ing of the subject with Dr. Lobingier before the meeting, we were discussing the subject of anaesthetics, and agreed upon the point that in all those cases where there is empyema that the use of a general anaesthetic is a dangerous procedure. In a case of Dr. Lobingier's he remarked to me that he had used ethyl chloride, using local anaesthesia entirely. In a case upon which I operated in the last year I used the local anaesthetic by the injection of the tissues, or what is known as the infiltration method. I think the point made by Dr. Freeman, that the main thing we desire is the evacutaion of pus, is a good one. But if you can evacuate the cavity and give it free drainage by the resection of one rib, instead of more, I think you accomplish the same result.

Dr. Macomber: I did not expect, when I came up here to attend this association, to make any remarks whatever. After hearing this article, I should like to refer to one case which I had a short time ago. It was that of a young man who was in the marine service. He was in the hospital two or three months, and was recommended to come to Colorado on account of lung trouble. He had been under treatment for tuberculosis for one month in Delta. He was in a very bad way, unable to sleep, nausea and fever almost continuously, and could eat nothing. I saw the boy on the morning of January 23 and made an examination. I was able to see at once that the left side was very much distended, and you could see no intercostal depressions whatever. I concluded at once that there was something that ought to be evacuated. I soon saw pulsations under the right nipple, which indicated the location of the heart. That afternoon I aspirated and drew off about two quarts of quite heavy pus. I then decided that it would be a good idea not to draw it all off at once. The next morning I drew off another two quarts. I then put in a rubber tube and irrigated twice a day for about five days with a normal salt solution. By the way, I will add that the boy had a cough and very great dyspnea. After about five days this all ceased, and he did not cough at all, except when I irrigated. After about the fifth day I began using iodine solution and would usually finish with normal salt solution. In about six weeks time I quit the irrigation altogether.

The third day after the operation the boy weighed 107½ pounds. In ten days from this time he weighed 127½ pounds, a gain of twenty pounds in ten days. He is now well and strong, working as section hand on the railroad, and weighs about 150 pounds. There has been no return of the trouble.

Dr. Lobingier: I desire to thank the gentlemen who have accorded my paper such generous discussion. If it will be remembered my subject was "Resection of the Ribs in Empyema," and not "Aspiration" or "Drainage" or even "Empyema" itself —which is much too great a subject to discuss in the time allotted. It will be found that I have touched most of the points germane to my topic. I am glad that Dr. Finney has spoken of the proper anaesthetic. Nothing could be of more concern to the operator than the anæsthetic in this operation. I have answered Dr. Whitney's argument in the body of my paper. Tubercular subjects are not favorable ones for extensive costal resection, and tubercular children having effusion should have no more than thoracotomy or single resection, for drainage purpose only, as Lockwood has urged. Double drainage tubes I have used for a number of years in thoractomies for simple drainage. I recommend gauze as a temporary drain from the dependent portion of the resected, denuded and collapsed walls in multiple resection, just as one would drain any large wound for twenty-four hours to avoid collection of serum and blood in the dead spaces. Children bear resection very poorly, and in both tubercular and post-pneumonic cases thoractomy and drainage are the proper measures to pursue.

THE PROBLEM OF THE AGE IS LIFE.—DEVELOPMENT IS CONSERVATION OF ENERGY.

BY B. A. ARBOGAST, BRECKENRIDGE, COLO.

I am aware that I have attacked a large and expanding subject, a subject that to myself has been the all-absorbing thought, from the day that I began the noble study of medicine; one that has filled me with admiration and awe. The evening that I received my diploma, when I received the beautiful flowers from admiring friends, the thought was impressed upon me: Could I, or would I, be able to give the sunshine of *life* to some poor pain-racked mortal, advise and lead him over and out of the slough of physical despair that comes from pain and misery? And, as I travel along, I find its force ever increasing.

That the physicians and surgeons are the arbiters of the race none will deny. They usher them into the world and see them out of it. Therefore, it seems to be the province of a physician to develop the latent energy stored in the life of every individual, ease the pain and correct the deformities that he has, whether he is heir to them or not, thereby turning loose the energy that development brings.

No one has yet been able to define life. The manifestations of life are through the senses. The physician and surgeon has always to do with the life of his patient, while he accomplishes his *great* purpose with and through the body. There is no subject the contemplation of which gives the satisfaction that the study of *life* does to the real student. Every physician and surgeon knows that if his patient is cheerful the chances for retaining his life in the body are ten to one in his favor, while despondency is equally the reverse.

All railway surgeons are aware of the fact that the physical shock is much more intense in a wreck that occurs in the daytime than in one that occurs at night, because only part of the senses are cognizant of the carnage around them.

The twentieth century seems to be on the eve of some new development or manifestation of life or stored up energy that will give the physician and surgeon increased power to comprehend this great something—life. The minister has about outlived his usefulness, if he ever had any. The great teachers of life are the physicians and surgeons—to them belong the aggressive spirit, the spirit of the age, the turning loose of that pent-up energy that has only needed development through the body to transform a race from misery and woe to a life of joy and happiness. To demonstrate that man is energy directed by intelligence, physicians want to help men to live; they can die any time. Don't tread on the life-line, or it may snap. Life is that intangible something, the manifestation of whose workings can be seen, but never known. It is an invisible sphere of energy that even biology does not explain or demonstrate. What a misnomer the definition of biology is, to say it is the science of life, while it should be the phenomena of life, for it uses the body only for convenience, while it is the glory of the phyisician and the crowning act of his profession to alleviate suffering and to prolong life, in no matter what kind of a body; and it is a fact that the age of man has been materially lengthened by prophylactic and hygienic medicine.

It is the duty of all physicians to educate the people that prevention from disease is superior to curing it after it is contracted. Does any one despair of educating the public to an appreciation of the great truths of sanitary science? Does the labor seem too arduous and too long? We must educate the people that there is no better method yet known to prevent the spread of contagious disease than vaccination and quarantine; teach them as to how the poisons of epidemics are developed and diffused, and we can soon remove much of the antipathy to vaccination. Teach them in a common way that a pile of decaying filth in the gutter or back yard has much to do with the development of that dread disease, diphtheria, that could be avoided by removing the cause. Teach them that, with the twentieth century, has dawned a civilization of light, a conservation of energy superior to any hitherto known. Has barbarism to continue forever? Was the creature fashioned in the image of Almighty God, and

endowed with intellect and reason, to be capable of no permanent improvement? Is humanity on a mighty pendulum in the cathedral of eternity, swinging through the aisles of time, from darkness into the light and from the light back into the darkness again and again, in endless iteration? Can this be the fearful destiny of our race? No! There is a better fate for humanity. The discoveries of our great physiologists and pathologists are immortal, and will survive the shock of empires, outlive rival creeds and witness the decay of successive religions. The inductive reasoning of the immortal Bacon came as an electric light, penetrating the darkness, and with one bound human thought was changed from a false to a true reasoning, advancing medicine more since that time than all the preceding ages.

Physicians and surgeons have always been the real and true humanitarians. The vista opening before us reveals one grand panorama of life, health and happiness. In this grand march the physician must be a true soldier. In this onward progress there can be no retreat. In this contest for the purpose of giving to man the right and the opportunity to live the years which God intended him to live, there can be no defeat.

MENTAL DISTURBANCES IN THE COURSE OF CARDIAC DISEASE.

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The great diversity of psychical disturbances, both in degree and form, which often complicate cardiac affections, is one of the reasons that the real character of these disturbances is not infrequently overlooked by the general practitioner, who, more than any one else, is concerned with the handling of this class of diseases. Yet, inasmuch as the liver, the kidneys, the intestines, and the other organs of our body, become so widely altered in their function under the influence of a more or less pronounced pathological condition of the heart, we must be prepared to meet, even more often, with similar aberrations in an organ so delicate

in its structure, and so largely dependent on the circulation, as the brain. The attention of the general practitioner having been called to the subject, some of us will surely recall in our experience cardiac cases where intercurrent complications of the brain have escaped a more detailed observation, either on account of a lack of familiarity with these indirect manifestations of an unbalanced heart, or because the exhaustive effects of the primary disease, and suspected complications of another nature, such as uraemic poisoning, etc., had led us to overlook the fundamental cause of the observed nervous and mental symptoms.

Of the several cases, in my own experience, of psychoses in the course of cardiac disease, I consider the following as very illustrative:

A married lady 45 y. of age, in comfortable circumstances, well built, intelligent, still menstruating regularly, and perfectly normal mentally, had been suffering from severe recurrent articular rheumatism for nearly ten years. Endocarditis, with all its consequences, followed, and led to a condition of health that through all these years had been to the patient a period of almost continual invalidity. I must mention in this connection that the popular prejudice against high altitudes in valvular disease did not find a confirmation in this special instance. Several attempts to remove the patient to different places on the Atlantic and Pacific costs, also a trip to Europe, were followed by such an alarming aggravation of her condition that further experiments in that direction had to be entirely given up, the woman feeling more comfortable in Denver than in any of the localities where she had sought relief.

I saw her first at the height of an attack of disturbed compensation of the heart. It was a case of double valvular damage, of insufficiency of both the aortic valve and the mitralis. The patient was extremely cyanotic; dyspnoea, general dropsy, congestion of the lungs, stomach, etc., scanty urine and slight albuminuria, a rapid and very irregular pulse were the most prominent clinical features of the distressing condition. A few weeks' energetic treatment with diuretin and digitalis, frequent administration of large doses of calomel, an ice bag over the region of the heart, and an appropriate diet restored the patient's health to

such an extent that she could freely walk around, visit her friends and even attend to light housework. All of a sudden a change set in, brought on by a severe cold that the patient contracted during the wet season. The cold subsided in a few days, but symptoms of disturbed circulation gradually began to come to the front. For several days her condition did not present any alarming symptoms at all. We could, however, already at that time, notice a certain change in the disposition and conduct of the patient. Reasonable and easiiy manageable up to the period of the present illness, she now became cross, peevish, irritable, and extremely obstinate. A trained nurse was emphatically rejected by her. She refused to take medicine, quarreled with those around her, wanted to be left alone, and treated every one in a most unfriendly manner. She would keep her eyes fixed in one direction, as if absorbed in meditation, and answer questions in monosyllables with a marked effort. At other times she showed signs of extreme uncontrollable restlessness and excitement. Perfect insomnia, which did not yield to large doses of bromides, completed the picture of this complicated condition that I had to cope with. The urine of the patient was closely watched, but nothing extraordinary could be detected.

One day I was told that the patient had been unusually excitable and irritable during the whole forenoon. She was found in her nightgown, sitting in a chair in the middle of the room, oblivious to her surroundings. When addressed, she threatened to jump out of the window if not left alone. Gradually she became more quiet, but more reticent and suspicious than before. She was still in the same state when I called in the evening. To induce her to take medicine was a fruitless task. The exhausted woman needed sleep most urgently, not having had any rest for nearly three days and three nights. Having previously tried, without success, all kinds of sedatives, I finally took refuge in morphine, which is so highly praised for this condition by Allbutt, Balfour, and other eminent clinicians. Only one-eighth of a grain was administered subcutaneously, with the intention to repeat the dose after a while if necessary. The effect was really remarkable. In ten or fifteen minutes the patient was fast asleep. Her respiration became quiet, the pulse stronger and more regular

than it had been for days. Six hours later I was hurriedly summoned to the house, to find my patient dead. The catastrope came unexpectedly. She suddenly awoke, gasped for breath, fell back on her pillow, and was gone.

An undoubted case of acute transitory mania in a child of eight with chronic valvular endocarditis, during an attack of failing compensation, fortunately did not take such a sad termination. Here bromides alone did their duty in a very gratifying manner, the little patient completely recovering from the spell in a few days.

I know of a case of mitral insufficiency that had been under my care for some time, where the patient, a man of 40, committed suicide in a fit of melancholia. The fact was confidentially disclosed to me a year later by the patient's wife. During a fit of mental depression, and while left alone in the room, he swallowed the contents of a bottle of carbolic acid, which was afterwards found empty under the blanket.

There is no consensus of opinion among clinicians as to the causal relation betwen the abnormal function of a diseased heart and the mental disorders that may incidentally occur. Post-mortem examinations have, for obvious reasons, not thrown much light on the subject; nor has clinical experience so far been able to establish the connection between the special variety of mental deviation on the one hand, and a pathologic heart on the other. It nevertheless appears to be a reasonable conclusion that a disordered circulation, bearing heavily on the nutrition of the brain, must eventually be productive of abnormal mental symptoms. Even admitting on the authority of Foster[1], Landois[2] and other physiologists*, that the absolute quantity of the blood in the brain is very little, that the interchange between the blood and the nervous elements and the metabolism of the brain substance are also small, it is the extreme sensitiveness of the organ, and the complexity of influences which regulate its work, that make here the metabolism important, "not so much on account of its quantity as of its special qualities." The metabolic process in the brain must, however, be sufficiently intense, since, according to Mosso[3], the temperature of the blood coming

from the barin is slightly higher than that of the arterial blood and of the rectum.

Just as the heart is easily and promptly affected by the slightest of our emotions, so is a similar result in the brain caused by every marked change in the circulation. "The blush due to passion, the lividity produced by intense fear, and a *condition of general irritability common to subjects with heart disease,* are all examples of mutual connection between the mind and the circulation"[4]. A rise in the arterial pressure produces a more rapid flow of blood through the cerebrum, and with it a rise of the venous and intracranial pressure in general[5]. An opposite effect takes place when the pressure in the arteries has become lowered. Any interference with the blood supply of the gray matter of the brain, either by increase or diminution,—leaving aside the quality of the blood,—must naturally result in some alteration of the normal activity of the brain. Fortunately, both an over and underflow of the blood in the brain are automatically kept under control by the cardio-inhibitory center of the medulla oblongata, and by other regulating mechanisms. This arrangement, although proving perfectly adequate under normal conditions, must decidedly suffer when the heart loses its equilibrium, and for weeks, months or years, fulfills its function in a wrong way. According to Dr. Hack Tuke[6], it is an established fact that certain districts are more productive of heart disease than others, and in the asylums connected with these districts mental affections are more prevalent than in other institutions of that kind. With the frequency of cases of cardiac disease, it is rather astonishing that the records of concomitant mental manifestations are so limited in proportion. We must think, then, of an innate individual power of resistance of the brain substance that protects the vast majority of cardiac patients from this complication, while some of them respond easily with their mental apparatus to the vicious effects of a heart that fails to properly supply it with the needed food.

The character of mental disturbances in cardiac disease will largely depend on the altered circulatory relations inaugurated between the heart and the brain by the specific pathological

condition of the former. Lesions of the different valves, bearing in different ways on the distribution of the blood and on the velocity of the blood flow in the cerebral organs, will differently affect their nutrition and function, and consequently produce a diversity of mental aberrations. Thus in mitral incompetency, where the recurrent flow of the blood is constantly meeting with an obstruction, venous engorgement, or passive hyperemia, will take place. Any mental disorder observed under these circumstances ought to be different from those accompanying cerebral anæmia, as, for instance, in the case of a narrowed aortic orifice. Clinical experience seems to confirm these a priori deductions. In valvular insufficiency of the mitralis, mental depression, gradually developing into simple and agitated melancholia, is the predominant form of psychosis met with in the course of this affection. The patient appears reticent, down-hearted, apathetic, and dissatisfied with both himself and his surroundings. Instances of suicide are not infrequent in this condition, decidedly more so than in affections of the aortic valves. Altogether, psychoses are more frequently observed in connection with aortic defects than in failure of the mitralis. The symptoms of mental disturbance here partake more of the nature of mania, and resemble the delirium of alcoholic pneumonia. Extreme irritability, excitement, fretfulness, restlessness, inconsistency, querulousness, make it sometimes very difficult to control the patient. The contrast between his usual ways of acting and thinking, and the observed change in temper not infrequently amounting to violence, is so striking, that suspicions of insanity even enter the mind of the laity that take care of him. These suspicions are often too well founded, and become confirmed in the outbreak of a real mania, with all the distressing features and consequences of this special form of psychosis. Troublesome and exhaustive sleeplessness is especially noticeable in aortic insufficiency.

A strict correspondence between the variety of heart disease and the form of insanity, is naturally not to be expected, although Mickle[1] has made the attempt to divide the different cardiac affections in nine groups, according to the more or less typical mental disorders that they are apt to produce. It is not

always that these disorders run the same course in the cardiac affections with which they are connected. Almost every case of mania, as has been rightly said, commences with a stage of depression. Hypochondriacal ideas may gradually and ultimately develop into delusions, general irritability turn into maniacal excitement. A classification of mental and cardiac disturbances in their respective dependence on one another would therefore prove a difficult and ungrateful task.

Looking over the literature of the subject, in which the bulk of contributions belongs to the alienists, we find that the mental disturbances in cardiac patients have not escaped the attention of both the specialists and the clinicians in general. Aside from the standard text-books on medicine which devote from a few lines to half a page to this complication, mention of it is, of course, largely made in most of the works on mental diseases. Altogether one gets the impression that not much importance is attached to the direct influence of valvular and heart disorders on the appearance and development of abnormal mental conditions. Osler[8] says: "In general medical practice we seldom find marked mental symptoms (in connection with heart affections) except toward the close of the disease when there may be delirium, hallucinations and morbid impulses. We do meet insanity breaking out in a patient with aortic and mitral disease, in the stage of compensation, which appears to be related definitely to the cardiac disease." In the most excellent French Cyclopedia of Charcot, Bouchard and Brissaud[9], in the chapter on mania, melancholia and other forms of psychoses, cardiac disease is not enumerated among the etiologic factors occasionally responsible for these mental conditions. In the chapters on Anæmia and Hyperæmia of the brain, Brissaud[10] considers it probable that circulatory derangements originating from heart disease may *sometimes* have something to do with insanity, but he adds that there is not always foundation in the belief that the mental excitability in these cases is actually associated with congestion. Yet, the expression "folie cardiaque" is of French origin (Lasegue, Huchard), and designates the acute delirium observed in connection with cerebral congestion when the heart is asystolic. Savage[11] is more explicit on the subject. He says:

"With aortic, or both aortic and mitral disease, the symptoms may be either melancholic or maniacal; but I am inclined to think that with simple aortic disease, with hypertrophy of the left ventricle, it is at least not uncommon to meet with acute mania and exaltation of ideas. In doubtful cases of men with exaltation of ideas, I expect to find post mortem hypertrophy of the left ventricle and atheroma of the aorta with more or less brain change."

Most of the writers express themselves very cautiously with regard to the close relation between mental and cardiac disturbances. That incompetency of the aortic valves is more liable to affect the brain than pathological conditions of the other valves of the heart, is recognized by all the authors. Allbutt[12] states that even in the latent and stealthiest phases of aortic insufficiency we may note certain mental perturbances which are not unknown in other heart diseases. The delirium that is here observed is usually one of place, the patient acting under the delusion that he is in a strange house, or far away from home. Recently Telgmann[13] reported five cases in which the delirium was very active, and in each case marked by the delusion that the patient was among strange surroundings, and prevented from returning to his home.

The correlation between insanity and cardiac disease has been studied by many, thus by Fauconneau[14], Ball[15], Vallin[16], Blanford[17], etc. Eichhorst[18] describes a condition, termed by him "Toxæmic Delirium," which he observed in cases of uncompensated valvular disease, when the use of digitalis was followed by sudden polyuria and a complex of violent symptoms. They gradually subsided when the diuresis returned to the normal. He believes that the mental disturbances in such cases are due to the absorption of a toxic substance present in the dropsical blood. Riegel[19] also reports cases of that kind with extensive dropsy where delirium of a character similar to that in Eichhorst's cases occurred simultaneously with the removal of the dropsy. He corroborates the hypothesis of intoxication by substances contained in the dropsical fluid. Telgmann[20] denies these toxic influences, and is inclined to attribute the mental outbreaks to a sudden overstrain of the heart.

Mania and melancholia seem to be altogether the most common forms of mental alienation in connection with cardiac disease. It is strange that these two manifestations are also the most prevalent in cases of so-called *puerperal insanity*. Another analogy between these two predisposing causes of mental disturbances is to be found in the sudden onset of the symptoms in both these disease, also in the favorable prognosis, and in some other particulars which need not be further dwelt on here.

The causes which lead to puerperal insanity are as yet an obscure field of theories, guess-work, and controversy. That a normal process, which the great majority of women have from time immemorial gone through without any damaging consequences to their mental health, should in certain easy and otherwise uneventful cases be followed by severe mental disturbances, is at first sight incomprehensible, and, therefore, a matter of great interest to the medical student. It is not, as we should expect, in *primiparae* where we find the largest percentage of these occurrences. Here the novelty of the event, the apprehension of the possibly grave results of the pregnancy, the psychic effects of the awakened instinct of motherhood, and last but not least, the trials during parturition itself, could to a certain degree serve as ethiological factors of this complication. In the experience of Bevan Lewis[21] only 32.3 per cent. of cases of puerperal insanity were primiparæ. Hoppe[22] found the proportion as high as 45 per cent.; the usual percentage of authors is between 30 and 35. Nor do those cases of pregnancy consequent on *illicit relations,* where the shame, the dread of publicity and of social ostracism, hold the woman under a great mental stress, figure as a predisposing cause of puerperal insanity. Out of the 112 cases collected at the Norriston Asylum of Pennsylvania, not *one* of the women confined was unmarried[23]. Morel[24] states that puerperal insanity seizes the virtuous mothers of families even more frequently than the women who, especially in Paris, find so easily the means of concealing their shame and the fruit of their illegal love. While Clouston[25] found about 25 per cent. of his cases to be illegitimate, in Edinburgh the average rate of illegitimacy was only about 10 per cent. To make *septicaemia* responsible for the insanity, seems also to be groundless. In

true septicæmia, ushered in with the usual signs of puerperal fever, insanity is a rare occurrence[26]. Puerperal insanity, furthermore, is equally met with in nervous women as in perfectly rational patients that are free from any hereditary stigmata.

Is it not, therefore, obvious that besides the enumerated predisposing causes some *special cause* must be looked for to explain the occurrence of puerperal insanity, particularly in those cases where they can be safely excluded, and where the outbreak of the disease is least expected?

In consequence of the greater activity of the circulation the arterial tension is generally increased during pregnancy[27]. The veins, too, are fuller[28], which is manifested by the frequency of varicose enlargements. The propulsion of the blood being, therefore, effected by the aid of an increased strain of the heart, we find cardiac hypertrophy as a constant phenomenon of pregnancy[29]. Both ventricles undergo slight eccentric hypertrophy, the left more than the right. The increase in weight of the heart (8.8 per cent. of the normal weight) continues with the duration of pregnancy up to the day of labor, and is followed by a reduction, which is rapid at first, and more slow afterwards[30]. The cause of the hypertrophy is to be sought in the increased work thrown on the heart in supplying the placental circulation, the uterus and the mammæ, with blood. Moreover, pregnancy increases the quantity of the blood, as was demonstrated in pregnant dogs and sheep (Spiegelberg, Gescheidler, Heissler).

As in the uterus, the involution of this cardiac hypertrophy may, in exceptional cases, be imperfect and become permanent under the strain of rapidly following pregnancies. Hypertrophy of the left heart tending to increase the diameter of both the mitral and aortic valves, the condition of valvular insufficiency is thus easily explained. *In a small number of cases, valvular disease is, indeed, traceable to pregnancy and to the puerperal state*[31].

Latent cardiac disease of rheumatic origin *antedating* pregnancy frequently reveals itself first during gravidity. "A crippled heart may cause no serious disturbance in the non-pregnant condition, but when pregnancy occurs, it is unequal to the increased work thrown upon it, and cardiopathic accidents may

set in"[82]. The time when gravido-cardiac accidents begin, or become intense, is from the third to the sixth month, generally in the fifth. In labor the danger from cardiac disease is greatest.

The physical signs of simple non-malignant endocarditis are notoriously not always characteristic[83]. The great majority of the cases are latent, and there is no indication whatever of cardiac mischief. Experience has taught that endocarditis, and even insufficiency of the aortic valve, are frequently found in persons in whom it had not been suspected during life[84].

The preceding considerations lead to the two following conclusions: (a) that the heart in a number of women during pregnancy and the puerperium is subject to hypertrophy, which may become permanent, and pathologically affect the valves; and (b) that latent cardiac disease of rheumatic and other origin may first come to the front during pregnancy, or in and after labor.

If we only admit that cardiac disease in general is under certain conditions capable of producing mental disorders of a typical nature, then could not puerperal insanity, in some obscure cases at least, be brought in connection with either a latent, or previously diagnosticated affection of the heart?

In cases of puerperal insanity where a diseased condition of the heart was certainly known to exist, the cardiac affection, so far as I can judge from the literature, has never been given any importance in connection with the coincident puerperal psychosis. To cite an example: In his recently published Clinical Lectures, Kraepelin[84] describes three typical cases of puerperal insanity, one of which gave a history of apoplexy three years previous to pregnancy, and another showed signs of an enlarged heart with an apical presystolic murmur. Yet he passes these data without any further comment.

Cardiac disturbances of any kind might be oftener discovered in cases of puerperal insanity, if more attention were paid to the condition of the heart in obstetric practice, and thus, perhaps, indirectly contribute to the study of mental manifestations in relation to cardiac disease.

DISCUSSION.

Dr. Hall: It ought to be mentioned that these disturbances are most frequently associated with aortic regurgitation. I have had recently in the County Hospital a poor Swedish patient with this disease who has repeatedly expressed the wish to die, and even attempted suicide. Why the mental disturbance is especially found in this connection is not known, but it is probably connected with the fact that in aortic leakage pain is more frequently seen than in other valvular diseases.

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THE TREATMENT OF NEURALGIA WITH CASTOR OIL, WITH REPORT OF CASES.

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A most careful search of medical literature by the librarian of the Newberry Library of Chicago, where there is every facility for investigation, fails to reveal any data whatever upon this subject, excepting the paper by Dr. Harold N. Moyer, of Chicago, appearing in the *Journal of the American Medical Association* of April 21, 1900.

We are indebted to Dr. Moyer for calling our attention to the importance of this much-despised remedy in the treatment of a most formidable disease. Dr. Moyer's attention was first called to the value of castor oil in the treatment of neuralgia by Dr. Ochsner of Chicago, who had seen mention of it in a German medical journal but could not recall the reference.

Careful search by Dr. Moyer failed to reveal any literature upon the subject. Dr. Ochsner had met with most brilliant results with this treatment of neuralgia, especially when involving the branches of the fifth nerve. Of thirteen consecutive cases coming up for operation all were either cured or greatly relieved by the administration of this simple remedy. While the results in Dr. Moyer's experience (1900) had not been as brilliant, yet they were far better than under any other treatment. Of seven cases treated by Dr. Moyer, five were neuralgias of the facial nerve and two were cases of brachial neuralgia. I quote largely from Dr. Moyer's paper, as the literature is so meager. Of the two cases of brachial neuralgia one was very severe and had been under other treatment for some time without the slightest improvement or relief. A large dose of castor oil was given at 1 o'clock and in three hours the pain in the arm was largely decreased. He rested well that night and the next morning the pain was entirely gone. Two or three more doses were given and there was no return of the pain.

Another case was that of a man thirty-four years of age

with typical tic douloureux of seventeen years standing. The intensity of the pain had greatly impaired his general health, and he had come for an operation, understanding that section of the nerve sometimes gave relief. The administration of the oil was followed by great amelioration of the pain and the patient considered himself cured. Still another case was that of a man thirty-seven years of age who had suffered with neuralgia of the right side of the face for five or six years. Three years previous to coming under treatment, the infra orbital nerve was divulsed and six months before the disease also appeared on the left side of the face, and he had come for surgical treatment. At the end of a week, under the treatment with castor oil, the pain was entirely relieved and did not return. In another case of supra orbital neuralgia of fifteen years duration a cure was effected by the administration of a half-dozen doses of the oil. In the discussion of Dr. Moyer's paper, which was read before the Chicago Medical Society, Dr. H. T. Patrick, of Chicago, who also had learned of the efficiency of castol oil through Dr. Ochsner, reported equally satisfactory and brilliant results.

My own experience has been somewhat limited, but sufficient to prove it an invaluable remedy. Most of my cases have been acute, which, it is conceded, are far more favorable for treatment than chronic ones. One case was that of a boy with intense supra orbital neuralgia. A few doses of the oil were sufficient to eradicate the pain. Another case was that of a tubercular patient with intermittent neuralgia of the infra orbital branch of the fifth nerve. It was of the most severe character and appeared every morning at 7 o'clock, lasting two hours, during which time the patient said he was fairly crazy on account of its intensity. This had continued for a number of days until two paroxysms of unusual severity occurred on the same day, when I was called to attend. Not a single paroxysm of pain occurred after the administration of the oil, which was contined for several days. The neuralgia was promptly cured and there has been no return.

In another case a patient was sent to me by a dentist to determine if there might be disease of the antrum, so persistent was the pain, and there being no condition of the teeth to war-

rant it. As no disease of the antrum was apparent, the patient was given a combination of quinine, phenacetin and codein in full doses, giving some relief but not entirely eradicating the pain. After three days of this treatment he was given castor oil in its place with the most happy results. The pain was at once subdued and did not return. This patient was vexed because I had not given the last remedy first. These are only a few illustrations of the beneficient results obtained in my hands by the administration of this medicine. Only in a single case have I been disappointed, but even in that case the pain was greatly mitigated.

No satisfactory explanation has yet been made to account for the prompt action of castor oil in the treatment of this affection. That the relief obtained is not due to the action of the oil on the bowels is evident from the fact that other cathartics do not give the same results. It is generally believed that there is some active principle in castor oil that has not yet been isolated and that the relief obtained is due to the effect of this active principal upon the sensory nerves.

The remedy should be given in doses of from one to two ounces three or four times daily, although in some cases I have obtained good results with much smaller doses. After the first two or three doses it loses its cathartic effect as a rule. We should guard against its too free cathartic action by sufficient doses of opium in some form, as it is the constitutional and not the local effect that we desire.

It is best given after having been thoroughly washed and a few drops of some aromatic essence added, either in milk with effervescing seltzer or in ale, especially Bass' ale. However, I have found that a very palatable mixture can be made by combining the oil with mucilage of acacia and lime water. It should be shaken thoroughly before giving. It may also be given in hot lemonade.

I am sure those who will give this remedy a fair trial will gain results never before obtained by other medicines in the treatment of this most painful and distressing affection.

DISCUSSION.

Dr. Hopkins: I have had very little experience with this

drug in the treatment of neuralgia. In the cases in which castor oil was used my results were probably due to the fact that a definite cause was found in each; eg: malaria and syphilis. As to the action of the drug, no plausible explanation has been reached, but perhaps the oil has a selective action, as is seen in atropin and eserine.

Dr. Espey: I have had some little experience with castor oil in the treatment of neuralgia for a year or so. The most gratifying results I have seen were this spring in persistent neuralgia following la grippe. Whether the neuralgia was the result of a specific action of the disease upon the nerves or the ordinary depression following an exhausting disease, I am not prepared to say; but I found those cases of neuralgia to be stubborn and not to react to ordinary treatment for neuralgia. Any depressing treatment, and especially the use of the coal tar products, was not to be considered. In cases of this nature I found oleum ricini quite a positive help and its results were occasionally astonishing. I have not found it necessary to use as large dosage as Dr. Waxham suggests; in fact, to give a half-ounce three times daily has given me good results and I have not had to continue the treatment more than four days.

Dr. Waxham: It is a fact that castor oil does not affect other pains than those resulting from simple neuralgia. It has been proven to be useless in the treatment of migrain, and in those cases of neuralgic pain resulting from the pressure of syphilitic nodules upon the nerves it has likewise proven a failure, but in pure, simple, uncomplicated neuralgia there is no remedy that compares with it.

A STUDY OF THE HEMORRHOIDAL CIRCULATION, WITH SPECIAL REFERENCE TO THE PREVENTION OF POST BLEEDING IN RADICAL OPERATION FOR PILES.

BY WILL B. DAVIS, M. D., PUEBLO, COLO.

One would naturally infer that if all vessels of bleeding size were thoroughly secured either by use of the ligature, or clamp and cautery, there would be no post-hemorrhages in pile operations. This I know from personal observation to not always be true.

The raw surfaces after the Allingham operation, and those which obtain from the fifth to the seventh day after the use of the clamp and cautery, or from hypodermic injections, are sometimes the sites of serious post-operative hemorrhages.

The first hemorrhage of the kind that came under my notice was at the St. Louis City Hospital some years ago. The then rectal surgeon to that institution did the Allingham operation one Sunday morning, and on the Saturday night following the patient came very nearly bleeding to death.

Matthews relates a similar case occurring in his practice—that is, on the seventh day after operation. Others have had like experiences, and patients have died from such post-operative hemorrhages in the hands of some of the best surgeons, as the elder Gross, Sir Astley Cooper and others.

The next two cases of post-operative hemorrhage which I saw were in patients who had been treated with the hypodermic method by a professional friend. One of these occurred on the sixth and the other on the seventh day, at a time when the injected tumors were sloughing. Each had bled profusely when I saw them. In neither case had divulsion been done, and at the request of my friend, I did thorough divulsion as a preliminary to hunting the bleeding points and adopting some measures to check the hemorrhage. But in both cases, to my surprise, after thoroughly paralyzing the muscular fibers, from anus to

ampulla, and washing out all retained clots, no bleeding points or blood from any source could be found.

The only case of post-operative hemorrhage occurring in my own practice was in a delicate man who had formerly had repeated hemorrhages from the lungs, and although he seemed recovered of active tuberculosis at the time of the operation, the tissues were much thinned. I did the least possible amount of stretching in this case, fearing, should I carry divulsion to the full, as had been my custom, it might be followed with incontinence. On the fourth day the patient began to pass blood in considerable quantities, and by the time I was ready to actively interfere, he had grown quite weak and anemic. I was alarmed, and without regard then for the question of incontinence, as soon as he was well under an anæsthetic, I very thoroughly divulsed. Again, to my great pleasure, when I had flushed out the rectum, there was no sign of hemorrhage to be found. None of the ligatures had slipped, and I was quite satisfied to dispense with the rectal pack, or any further measures.

These experiences led me to speculate as to the active cause of such hemorrhages, and also why the complete stoppage of all bleeding from the divulsions alone.

"Verneuil has laid stress upon the fact that where the internal or superior hemorrhoidal veins perforate the rectal wall from within outward, they pass through 'muscular buttonholes' surrounded by no fibrous tissue, and having, therefore, the power of contracting around the vein, closing its caliber, and preventing the return of blood to the liver. In this anatomical arrangement he believes he has found the active cause of hemorrhoids." (Kelsey.)

I made some dissections confirmatory of these statements, and also to estimate the probable amount of arterial hemorrhage that might enter into post-operative bleeding. I believe that Verneuil was correct in his theory as to the active cause of piles; and, as to the part the arteries play in the formation of hemorrhoids, I am convinced that they do not enter as a factor in their formation at all; and from the very small size of any arterial radical entering a pile tumor, I believe that arteries contribute but little, or none, to post-operative hemorrhages. Nor have I

ever seen the spurt of an artery during but one of the hundreds of operations done by me for the cure of piles, and I always use the knife and ligature. In this exceptional instance the jet was from near the anal margin, where I was including in my dissection a very large tab, and unintentionally wounded the sphincter muscle.

I am aware that Kelsey and Allingham speak of arterial hemorrhoids. Indeed, they make this one division of hemorrhoids. They also state that they have seen arteries in pile tumors as large as the radial.

Nowhere in varicose conditions do we find the arterial system participating. We very well know that when an arterial trunk supplying an extremity is ligated, the collateral vessels enlarge, in time, approximately to the carrying capacity of such ligated trunk, collectively speaking. This is not on account of any venous changes afront, or of the heart's impulse from behind, but of nature's care of the needs of the economy.

Take, for instance, an extreme varicosity of the saphenous vein and its tributaries; or, if you please, of the pampiniforme plexus, constituting varicocele. Who has ever found or suggested arterial complicity in these conditions?

Hemorrhoids are nothing more or less than a varicose condition, superinduced, as in all other varicose conditions, by some embarrassment of the venous circulation beyond the varicosed vessels. There is no demand for an increased supply of arterial blood to the parts. The tissues are unable to properly dispose of what is already supplied. Upon the other hand, why should the venous obstruction here affect the arteries any more than it does in varicose conditions elsewhere?

I can understand how the capillaries may become dilated, and how the heart's impulse may not be altogether lost there, and a *per saltem* flow seen from a varicose vein, many of which in hemorrhoidal tumors are even larger than the radial artery.

A *per saltem* bleeding from veins in pile tumors I have myself observed frequently, but not with the jet-like force from an artery. To call such veins arteries because a faint *per saltem* flow may be seen coming from them is, I think, a mistake.

It is never indicated, in operations for piles, to invade the muscular wall of the rectum, and I have not been able to find, in a number of dissections, with special reference to the matter, a single artery lying between the mucous membrane and muscles, which appeared to me large enough to give troublesome hemorrhage—indeed, none which might not reasonably be excepted to retract and staunch themselves if cut.

Hemorrhoidal tumors are formed almost, if not exclusively, of veins and connective tissue. These varicosed veins lie between the mucous membrane and muscular wall, and in making their exit through the buttonhole openings in the muscles, they are constricted when that tissue contracts, and remain engorged until the irritation, whatever it may be, which causes the muscular contraction, subsides.

My theory in explanation of the causes of post-operative hemorrhages in these cases is based upon the same which Verneuil offers as being the active cause of hemorrhoids, and that thorough divulsion, from anus to ampulla, as a preliminary step in all operations, will prevent it, by rendering the muscles incapable of contracting upon the veins to a degree as to embarrass their circulation, and that in cases where such thorough divulsion has not been done, a resort to it, and to it alone, will immediately check all such post-operative hemorrhages as might occur, except in such cases where arterial bleeding may have been induced by having carried the dissection too deeply into the muscular tissue, or beyond it.

In his account of how he dealt with his post-operative hemorrhage, occurring on the seventh day, and without the aid of anæsthesia, Matthews says: "I immediately divulsed the sphincter muscle and tamponed the rectum. All hemorrhage ceased."

Two things suggest themselves to me here. The first is as to the advisability of undertaking to divulse the sphincter without anæsthesia; and the second, as to whether the divulsion in this case—allowing it was thoroughly done—did not check the hemorrhage, and that the use of the tampon was superfluous. It is rather hard to satisfactorily divulse some sphincters, without the use of an anæsthetic—physically hard on the physician.

and cruelly hard on the patient. Matthews gives as his excuse for doing this without anæsthesia, that the patient was very much weakened from the loss of blood. I cannot see wherein a patient's strength can be conserved by being subjected to such an ordeal as divulsing the sphincter and packing an inflamed and sansative rectum without anæsthesia.

The rectal pack is at best unscientific, and a most uncomfortable thing for a patient to endure. Indeed, I do not believe any patient would be able to retain a tightly fitting rectal tampon without the liberal use of opiates to overcome the distress which they would inevitably cause, and yet every work on rectal surgery, which I have examined, recommend their use, for the control of post-operative hemorrhages.

I do not know if the anatomical arrangement of the hemorrhoidal veins, as pointed out by Verneuil, has ever been studied with reference to utilizing the fact for the control of post-operative hemorrhages.

I feel convinced that thorough divulsion of the rectum from anus to ampulla as the first step in all operations for the cure of piles would prevent these hemorrhages; for, after such divulsion the muscular wall will not recover its contractility sufficiently to embarrass the veins in their blood-returning function by compressing them at their points of exit, at least until the healing process is fairly complete.

Most surgeons use a degree of divulsion; some, but little, on account, as they claim, fear of incontinence. It has been my custom to divulse to the utmost, and in the many operations done by me, I have had no such sequel.

Thorough divulsion is indicated as an expedient in doing a complete operation. After such divulsion, the pile-bearing area of the rectum is not only open to view, but rendered easy of operative manipulation. It also conduces to more comfort during the first few days following operation, by modifying painful contractions of the sphincter upon extremely sensitive wounds.

Whether this theory is accepted or not, I would recommend to the surgeon who should have to deal with a post-operative hemorrhage to first very thoroughly divulse from anus to ampulla, and before hastily resorting to the rectal tampon, care-

fully inspect the field of operation for bleeding points. If none are found, I do not think he need apprehend further bleeding. Should there be any arterial hemorrhage—which would be rare or never in properly performed operations—it would be very easy, and far more satisfactory, both to the surgeon and patient, to secure it by ligature, for arterial hemorrhages are usually easy to locate, when from the face of a field of operation.

In conclusion, I wish to say that if this subject is investigated from the standpoint which I have tried to present it, the great and growing number of works on rectal surgery will cease to advocate the use of the rectal tampon in routine, as always heretofore; but that thorough divulsion from anus to ampulla will be recommended instead, with the aid of the ligature in possible exceptional cases where such divulsion is not entirely sufficient. And in such exceptional cases, the hemorrhage will almost surely be found to be arterial from the slipping or too early cutting through of a ligature, which had more than likely included some of the musculare of the rectum—an error which should always be avoided, for other reasons than those involving post-operative hemorrhages.

TUBERCULAR LARYNGITIS.

BY P. F. GILDEA, M. D., COLORADO SPRINGS, COLO.

Prior to the last few years the tone of the literature on tubercular laryngitis was entirely that of doubt as to the possibility of cure, and one treatment after another was advocated to overcome this dread disease. During the past year sentiment seems to be taking a turn towards nihilism in this trouble as in others. After having passed through the stages, first, that tuberculosis of the larynx is incurable, and second, that tuberculosis of the larynx can be cured by treatment, we have come to the stage where physicians claim that tuberculosis of the larynx cures itself. No one who has done much work in this field can help but regret that this period has reached our specialty. Case

after case illustrates the lamentable outcome of this doctrine and leads one to ask how a man can be so blind to evidence presented by the foremost specialists of the world. That laryngeal tuberculosis is curable by treatment few will doubt, except those who are inclined to take the recent view which I have mentioned. That tuberculosis must be treated is the doctrine which seems to be borne out by the largest number of facts. As far as the method of treatment is concerned, there is a wide field, and as in other diseases, each case has to be studied and individualized. I believe that it is more in the method of doing than by the material employed that cure is obtained.

There are certain general rules which I follow that seem to give me satisfactory results. In the first place, lactic acid stands supreme, but only in those cases where the tuberculous process has gone on to the papillomatous one. This papillomatous change, I believe, is nature's method of cure in 50 per cent of the cases, and in this class lactic acid will succeed in the larynx as well as it does in similar growths on the skin.

Formaldehyde stands a close second to lactic acid in these same papillomatous cases, and above it in almost all of the other processes, especially where there is a large amount of secondary infection with staphylo and strepto-cocci. Then I should place alcohol and salicylic acid, about five grains to the ounce, as third in all cases, and alcohol alone as fourth. Nitrate of silver will improve a certain number as nothing else will, and every now and then one is obliged to use one of the forms of iodine, or else his cases will not do well. Orthoform and similar of the newer products have not given me as good results. The derivities of the adrenals have been of immense help in making the applications very much more effective than they seem to be alone. A certain number of cases will do very badly unless the curette is used.

These have been the remedies which have given me the greatest success, and have also proved so very successful in the hands of my associate, Dr. S. E. Solly, of Colorado Springs, to whom I am extremely indebted for his kindness in showing me cases during the past nine years. The main element, however, in the successful treatment of this disease is that the rem-

edy, whatever it may be, shall be rubbed into the area involved. It does not do simply to throw these things into the mouth, or even into the larynx by means of a spray, or to blindly apply them in an indefinite way by means of applicator. In fact, I am inclined to believe that one-third to one-half of the value comes from the massage rightly applied.

DISCUSSION.

Dr. Waxham: Tubercular laryngitis is certainly one of the most distressing diseases that we are called upon to treat. The progress of the disease and the tendency of the tissues to break down depends so much upon the vitality of the tissues and the well being and the general health that too much attention cannot be given to hygienic and dietetic measures, as well as to constitutional treatment. On account of the pain and difficulty of deglutition, little nourishment is taken, and consequently there is rapid loss of vitality, and local measures of treatment become imperative. I have found the most beneficial of all local treatment to be the application, after careful cleansing of the extract, supra-renal capsule, followed by the thorough use of a 20 per cent solution of ichthyol in lanoline, the applications being made directly to the diseased surfaces.

Dr. Levy: Dr. Gildea's paper is one of a great deal of interest. There seems to be a disposition on the part of many Eastern men to oppose the climate of Colorado for cases of laryngeal tuberculosis. This view of our climate was held many years ago by men who had insufficiently examined its merits, and who were misled by articles written by Ingals, of Chicago, and Wagner, of New York. I am certain that we have a perfect right to claim that Colorado is not in any way deleterious to cases of tuberculosis of the larynx; but on the other hand, that these cases are benefited in more ways than one. Not only does the local conditions improve, but the general effect is recognized to be of great value in the establishment of a cure.

So far as the spontaneous cure of laryngeal tuberculosis is concerned, I am satisfied that this does occur; but with such remedies as are at present in vogue at our commend, we

are not justified in trusting to the possibility of spontaneous healing. Even in severe cases much can be done by local treatment for the relief of the disease's distressing symptoms.

So far as lactic acid as a remedy par excellence is concerned, this is subject to some question. I, myself, am a great friend of this remedy, but on the other hand I am reminded to take a conservative stand after reading the article of Dr. Freudenthal's, of New York, in which he states that lactic acid is one of the very worst remedies to use, he having entirely discarded it. His treatment, by means of orthoform emulsion, has given, in my hands, satisfactory palliative results, but nothing more.

Dr. Gildea: About the climate, it seems to me so ridiculous for men to make the statement that laryngeal tuberculosis does not do well in this climate that I did not mention it

SOME THOUGHTS ON ABDOMINAL SURGERY WITH A BRIEF REPORT OF CASES OPERATED UPON SINCE JANUARY 1, 1899.

BY I. B. PERKINS, M. D., DENVER, COLO.

The brief report of cases which I give you to-day I shall give from a purely statistical standpoint. I take the date, January 1, 1899, because my last statistical report ended at that time.

In this report are included all the cases that I have operated, from that date to the present time—a period of nearly two and a half years. A few of these cases I have already reported in detail, and some of them I shall include in similar future reports. I have divided them into three classes, viz: "Favorable," "Not So Favorable" and "Desperate." In the "Favorable" class I have included all the cases in which there appeared little or no doubt as to the patient's chance of recovery. In this class are all clean cases, not especially complicated—hysterectomy for fibroid tumors; hernia, not strangulated more than twenty-four hours; tubal pregnancies, ovarian cysts, appendix cases operated in the interval, those operated sufficiently early as to admit of closure

without drainage, as well as all cases in which a walled-off abscess was present and was simply opened and drained without invading or infecting the free abdominal cavity.

In the second class are placed the cases which were considered not so favorable, but were not so bad as to be classed as desperate. In this class are hysterectomy for carcinoma, strangulated hernia, if of more than twenty-four hours' standing, appendicitis, where the abscess is intra-peritoneal, or wherein an extra-peritoneal abscess the appendix was removed, endangering or infecting the free abdominal cavity; also any other case already septic.

In the third, or "Desperate" class are placed *only* those cases which were considered to have no chance whatever for life without operation, and to have very little chance with it. In this class are included all cases of general abdominal infection, such as appendix and tubal cases where an abscess has broken into the general cavity, badly strangulated bowel cases of long standing, severe hemorrhage into the abdominal cavity, from any cause, etc.

There were 173 cases operated in the time stated. Of these 152 recovered and 21 died.

In the "Favorable" class there were 81 cases, with no deaths.

In the "Not So Favorable" class there were 70 cases, with seven deaths, and in the "Desperate" class there were 22 cases, with 14 deaths. Considering the 173 cases as a whole, with the 21 deaths which occurred, gives a mortality of little more than 12 per cent. If the "Desperate" cases are taken separately, and the first two classes taken together, we have in these two 151 cases, with seven deaths, a mortality of about 4½ per cent.

The operation in the 173 cases was performed for the following conditions, and owing to more than one disease being frequently present, one case will occasionally appear under more than one heading, as, for example, in a case of removal of an ovarian cyst, the uterus may also be ventro-fixed.

There were 45 cases of appendicitis, 21 of hysterctomy, 27 of ventro-fixation, 26 of ovarian cyst, removal of diseased ovaries and resection of a part of an ovary; two cases of tubercu-

lar ovaries, seven tubal pregnancies, 14 cases of supurative peritonitis, eight gall-bladder operations (stones being found in all but one), 16 cases of hernia. In one case of hernia an ovary was found in the sac. The ovary was returned into the abdominal cavity. There were 13 cases of pyosalpinx, two of dermoid cysts, four of strangulated bowels, three of hydrosalpinx, two of intra-ligamentous cyst; three where small myomata were removed and the uterus left and one gunshot injury in the abdomen. In 11 cases exploratory operation was made for the purpose of completing the diagnosis and aiding in other operations, and in nearly all of these there was other work found necessary. In some of them, however, there was no other operation done but by means of the exploration, I was able to make certain a but by means of the exploration, I was able to remove all doubt as to the existing condition. Ventro-fixation was performed for the most part in connection with other operations.

APPENDICITIS.

The 45 cases of appendicitis I have tabulated below. They were distributed as follows:

	Cases.	*Deaths.*	*Recoveries.*
Pus in the free cavity	6	4	2
Intra-peritoneal abscess	16	1	15
Walled-off absecess	10	0	10
Early enough to close without drainage (these were sponged well with pyrozone)	7	0	7
Cases operated in the interval	6	0	6
Total	45	5	40

The death which occurred in the intra-peritoneal abscess case died nearly a month after the operation, of septic pneumonia.

In the posterior part of his right lung was a large abscess, a considerable of the contents of which he expectorated during the last few days of his life. The lower lobe of the left lung was also quite solid, and a large anti-mortem clot was found in the heart. It will be plainly seen from these cases that the deaths

in appendicitis operations nearly all occur in cases that are allowed to go too long before operation is performed.

HYSTERECTOMY.

I have also tabulated the 21 hysterectomy cases, as follows:

	Cases.	*Deaths.*	*Recoveries.*
For fybroids	8	1	7
Carcinoma	8	1	7
Sarcoma	1	0	1
Intra-lig. cyst	1	0	1
Septic (carcinoma, pyosalpinx, tub. preg.)	3	2	1
Total	21	4	17

In studying these, together with other cases, I come to the following conclusions:

First—In order for statistics to be in any measure accurate, or of value, a large number of cases must be taken. I notice, in looking over these cases, that from number 90 to number 125 there were no deaths, and in that period were included two of the septic peritonitis cases which recovered. I notice also that supuration is much more liable to occur in the skin than in the deeper structures; therefore, where time will permit, I like to place a castile soap poultice on the abdomen for several hours before the other preparation is carried out. As a rule, my patients are convalescent as soon as the bowels have moved freely; consequently, for more than two years I have followed the routine practice of giving four Improved Comp. Cath. pills, pulverized and put into capsules, two hours before the patient goes on the table, and these usually act within twenty-four hours following the operation. If the case requires immediate operation, and I have not time to give the pills before operating, I begin them as soon as the patient can swallow after recovery from the anaesthetic, and continue them, giving one or two every hour until the bowels move freely. Absolutely no nourishment is given until the bowels move, and then a very little weak broth is given at first, and in this way my patients have very little trouble with nausea and vomit-

ing, and I am sure that I save some cases that under my former practice would have been lost. In order to prevent hernia, I use as little drainage as possible, carefully cleasning any questionable part with pyrozone, and close the abdomen in layers, wherever practicable, using cat-gut for the most part. I use cat-gut only in the abdominal cavity, and have gotten no bad results from it. I formerly got some trouble from pedical ligature of silk.

Chloroform has been used for the most part in these cases. Occasionally a little ether was used in the same case where chloroform was used most of the time, and in a very few cases ether has been used exclusively, but I believe the patients vomit far less and that lung and kidney complications are not nearly so apt to follow in cases where chloroform is used, and in the hands of a careful anaesthetizer, I believe it to be fully as safe as ether, if not safer.

I have used very freely while on the table stimulation of strychnia, spartine, nitro-glycerine and atropia hypodermatically and oxygen by inhalation; also, have given large quantities of salt solution under the skin, frequently using more than a gallon in one case. Following the operation, I make a practice of using enemata freely, using at first one ounce of whisky, three ounces of coffee and four ounces of salt solution, and after a few hours salt solution is substituted for the coffee. These are usually given every two hours, and the results gotten are: First, stimulation; second, quenching thirst, and third, by their frequent use, the bowels are stimulated to peristaltic action, and a movement is more readily procured.

DISINFECTION AFTER CONTAGIOUS DISEASES.

BY G. E. TYLER, M. D., DENVER, COLO.

In the management of acute contagious diseases the health officer has four methods, the neglect of any one of which would be fatal to his success. These are: The isolation of victims of the disease, the detention during a proper period of those who are exposed, the destruction of all sources of contagion, and in certain instances the protection by vaccination or inoculation of those otherwise subject to the disease. The importance of a thorough knowledge of the methods of destroying contagion is hard to over-estimate. Yet it is probably no exaggeration to say that but a very small minority of physicians, and a far less percentage of the laity, possess accurate knowledge of the subject. It is the purpose of this article to set forth some necessities and to describe the methods of disinfection in detail. Disinfecting a room or house is an intensely practical task. No mere text-book knowledge is sufficient for its proper performance. To illustrate: More than one case has occurred where a health officer has practiced so-called disinfection without attempting to prevent the escape of the disinfecting gas, even by the closure of windows. Other cases are known where it has been performed with so inefficient strength of gas that the occupants of the room remained in the room without serious inconvenience. In other cases the burning of a sulphur candle, or the sprinkling of a little formalin about the room, has been the only disinfection practiced, even after small-pox or scarlet fever.

It may be well at the outset to enumerate certain difficulties which constantly arise in the work of disinfection. The open character of many houses, especially in the country districts, is one which is hardest to meet. In many of them, so to close the openings as to prevent the escape of a gas is an impossibility. In such an instance there are but two solutions of the problem—either the house must be destroyed or the disinfection must be by other than gaseous agents. A thorough washing with hot

water, and later a 1-1000 solution of corrosive sublimate is the most satisfactory treatment of premises of this class which cannot be burned. The second difficulty is the bleaching of fabrics, the corroding of metals and the discoloration of paints and varnish. It is highly desirable to use a disinfectant which will neither corrode nor bleach, for to prevent tell-tale spots is absolutely necessary to the popularization of disinfection. Other things to be considered are the possibilities of a destructive fire, when an agent is used which requires fire, the cost of the disinfectant, and above all else, the effectiveness of the agent used.

The discovery of an absolutely satisfactory disinfectant is still in the future. Barring steam disinfection, which is the best of all, but impossible of general application, there remain but two gaseous disinfectants which have stood the test. These two are sulphur di-oxide and formaldehyde gas. With these two, or with either, and a good liquid disinfectant for supplementary work, satisfactory disinfection in most instances may be performed. It is essential that whichever be used certain definite rules be strictly followed. To accomplish this the work should be done only by trained persons. To permit disinfection by the family, except in rare instances, is worse than useless, for the reason that it is imperfectly and improperly done, and a false sense of security is thereby fostered.

Whichever disinfectant be used, the first essential is absolutely to close all orifices of whatever character. The best way to do this is by the use of paper, gummed on one side. The adjacent surfaces to which the paper is to be attached are to be washed with a liquid disinfectant, such as bi-chloride, prior to putting on the paper. The paper is then adjusted so as to cover all cracks, in order that the gas may not escape. If even a small crack be left the gas rapidly decreases in strength and becomes totally inefficient as a disinfecting agent. The clumsy attempts to close cracks by stuffing in some old clothing is but futile. The gas permeates the clothing, and disinfection is, therefore, imperfectly performed. The gummed paper above spoken of is not only satisfactory but inexpensive, and should be kept on hand by every health officer. It is also necessary, no matter what disinfectant be used thoroughly to spread out all sheets, mat-

trasses and bed clothing of all sorts, to open closets and drawers and scatter their contents about, to stand books on end and to spread out their leaves, unless the books can be burned.

When sulphur is used, moisture must be provided, for without it sulphur is practically inert. To accomplish this steam must be generated in the room, or there must be an open vessel containing water. A good method is to take a tub and fill it two-thirds full of water, and in this water to place bricks, upon which the iron or earthenware vessel should rest. At least five pounds of sulphur should be used for each 1,000 cubic feet of space. Alcohol should be freely poured over it and a match applied. Even then the sulphur will sometimes cease to burn, thereby rendering disinfection inefficient. With the precautions above mentioned, danger from fire ought to be avoided, though some careful men have had disastrous fires in spite of all precautions. The house should be kept tightly closed for at least twenty-four hours when sulphur is used; where it is absolutely necessary that the house be occupied at night, two separate days of twelve hours each may be utilized, the amount of sulphur for the two days being ten pounds for each 1,000 cubic feet, or just twice the amount for one day of twenty-four hours.

There are two methods of disinfection by formaldehyde. One is by the use of the generator in which the formaldehyde gas is liberated by the application of heat; the other by the method commonly known as sprinkling, or better, spraying. Most of the formaldehyde generators and lamps now on the market are inefficient. There are, perhaps, no more than two which are suitable for ordinary purposes which generate sufficient formaldehyde gas to be effective. The others set free formaldehyd gas for a short time, but soon fail to liberate it, and the disinfection is, therefore, inefficient. There is the same or greater danger of fire with this method as in the one above mentioned. The second method of using formaldehyde is by spraying it upon surfaces from which it can readily evaporate, this being improperly termed "sprinkling." This is mentioned because the distinction between sprinkling and spraying is quite important from the standpoint of effectiveness. It is essential that the formaldehyde solution be sprayed with so even and fine a spray that it shall gen-

erate formaldehyde, and not paraform, as occurs when it is merely sprinkled upon the sheet.

The method of disinfection by spraying formaldehyde is thus described by Dr. Chas. W. Behm in a pamphlet issued by the Chicago Health Department:

METHOD OF OPERATION.

"When a house is to be disinfected all crevices around windows, doors, transoms and all openings into the rooms should at first be thoroughly sealed up, with strips of gummed paper about two inches wide and two feet long, to make the rooms as air-tight as possible. The surfaces under these strips should first be wiped with a cloth dampened in bi-chloride solution, 1-1000, for the purpose of removing all germs which would be sealed under the strips, covering the crevices. The stoves, fire-places and flues should also be closed, or, when it can be done, several thicknesses of newspaper placed over the opening next to the stove and the stove-pipe set on that. The draught caused by chimneys would soon weaken the quantity of the gas in a room, and just that much reduce the proper quantity necessary for the disinfection.

The beds should then be torn apart, the pillows hung over the backs of chairs or on lines, blankets and quilts hung over chairs as loosely as possible, bureau drawers are to be opened and the contents scattered and loosened; folded clothing must be unrolled. Books which came in contact with, or were used by the patient, must be set on end and the pages spread to their greatest extent. Rugs, which, through neglect, were permitted to remain in the sick room, must be lifted up on chair backs, to allow the gas to come in contact with every part of them. Open clothes closets and separate the clothes. Clothing which the patient wore during his or her sickness must be thoroughly looked after, and should be hung on lines stretched across the rooms. This also applies to all soiled clothes, handkerchiefs, etc.

The patient should be given an antiseptic bath and fresh clothes put on before being allowed to mingle with other people. This is especially of importance after small-pox and scarlet fever (and it might be said of any other infectious disease), as no

matter how thorough would be the disinfection, if this bath and fresh clothing be omitted the rooms are liable to again be reinforced, and the disinfection would be worse than useless.

After everything has been hung out and scattered about, a clothes line is stretched across the middle of the rooms, and on this line bed sheets are suspended, fastened by their edges with safety pins. They should not be doubled over the line. The sheets must hang high enough to clear the floor, and under them newspapers should be spread, to catch any drops of formaldehyde which might spatter in the sprinkling process.

METHOD OF OPERATION.

Sheets can be multiplied to any number, but one must be used for every 1,000 cubic feet to be disinfected. Everything then being in readiness for applying the formaldehyde solution, the operator takes the sprinkling apparatus in the left hand and the bulb in the right and, compressing it, forces the solution in very fine streams on the sheets. The operator should stand about three feet from the sheets to be sprayed. Here again care must be taken to spread the solution over the sheets as evenly as possible, but not to saturation, going over each sheet but once. One sheet will carry about six ounces, but more should not be applied to any one sheet. Experimental research has shown that the minimum required is at least 180 c. c., or 6 oz., for every 1,000 cubic feet of air space in the rooms to be disinfected. (The Colorado State Board of Health requires the use of seven ounces to each 1,000 cubic feet.)

A damp towel folded to several thicknesses and tied over the nose will permit the person using the apparatus to remain a little longer near the sprayed sheets. Always commence spraying the farthest sheet, working out, and after all have been sprayed the rooms should be left and the door of exit sealed at once. Thus prepared, the rooms should be left closed at least eight hours, where the conditions of the premises are good, but where poor conditions prevail a longer time may be required, according to the judgment of the disinfector. If large halls or school rooms are to be disinfected, several bottles should be filled beforehand to facilitate the work.

After the termination of the disinfection, the door is again opened and some of the gas allowed to escape before entrance is made into the rooms. Then one window after another is to be opened and the sheets taken down. If care has been taken in the sprinkling, and none of the solution dropped on the floor or carpets, the rooms can be occupied from one-half to one hour after opening. Should there be any odor of formaldehyde gas after one hour, a little ammonia water and oil of peppermint sprinkled around the rooms will soon dispel all traces of the irritating gas.

CONDITIONS TO BE OBSERVED IN DISINFECTION.

When the temperature is low, or near the freezing point, the full 40 per cent solution should be used; this also holds true till the temperature of the rooms reaches 78-80° F. When above that, disinfection will be much facilitated if the solution is diluted, and in excessively hot weather and rooms the solution can even be diluted one-half or more and then sprayed, depending greatly on the evaporation in the rooms. It is this added water, producing a "moister gas," which will very markedly add to the value of disinfection. But the minimum of the actual 40 per cent solution must then still be six ounces for every 1,000 cubic feet."

There needs to be mentioned the disinfection of the physician himself. I know personally of two cases of scarlet fever, occuring during the past three months, traceable to the carelessness of physicians in this manner. No physician should think of attending a case of contagious disease without unusual precautions to prevent carrying it in his clothing. The preparation best devised to effect this end is an antiseptic suit, devised by Dr. Jesse Hawes, and exhibited at the meeting of the Colorado State Medical Society in 1899. It is far from neat in its appearance, but it leaves little or nothing to be desired in effectiveness. If it were made of different material, and had a better fit, the only objectionable features would be removed.

In attempting to give a brief outline of the methods of disinfection, no attempt has been made to cover the entire subject, but if the matter has been made clear to those upon whom

the work of disinfection falls, the object which has been in mind will be attended.

DISCUSSION.

Dr. Bull: As far as we know, disinfection by heat (steam or fire) is the only absolutely thorough method that we have. The methods of disinfection by formaldehyde gas and sulphur are not absolutely to be depended upon as applied to every-day work in household disinfection. These methods should be supplemented by the free fresh air and sunshine, Nature's disinfection. I have only to agree with Dr. Tyler in regard to the importance of making the room as nearly air-tight as possible by pasting over cracks and closing the room for twenty-four hours for fumigation. I have used sulphur—one pound to every one hundred cubic feet room space; it leaves an objectionable deposit of sulphur di-oxide upon articles of clothing and tarnishes. During the past two years I have been using formaldehyde exclusively. The Marine Hospital service and the Indian School Hospitals are using largely the Kuhn formaldehyde generator. This generator has proven the most satisfactory in my practice. It holds two quarts of wood alcohol, and will keep giving off gas actively for twenty-four hours. Physicians and nurses should use every precaution not to become carriers of contagion. A gown with a hood should cover the clothing and head of the physician when visiting a contagious disease, leaving only the face and hands exposed. I carry such a gown in my buggy in a tight tin can, in which I pour an ounce or more of formalin; by adopting such precautions the danger of carrying contagion is reduced to the minimum.

Dr. Espey: There is just one small item in regard to sulphur fumigation. It is the question of being sure that there is moisture in the room. I think that in fairly large rooms, and more particularly in winter time, and it is in winter time that the air does not take up much moisture—an open vessel of water is not sufficient. I make a practice of hanging sheets that are wrung out in water about the rooms. The atoms of water are taken up more readily by the atmosphere, and there is more cer-

tainty of sulphur di-oxide being taken up by the atmosphere in an effective form.

Dr. Tyler: I meant to emphasize more than I did that both sulphur and formaldehyde are but surface disinfectants. The State Board of Health of Colorado has recommended sulphur in preference to formaldehyde in small-pox cases. There are, however, certain cases in which this agent cannot be used. I believe, with Dr. Bull, that the Kuhn generator is satisfactory, and that there is one other on the market. I am satisfied that we have not yet had a satisfactory disinfectant.

A REPORT OF ONE HUNDRED CASES OF TYPHOID FEVER SEEN IN PRIVATE PRACTICE DURING THE FALL OF 1900.

BY W. A. KICKLAND, B. S., M. D., FORT COLLINS, COLO.

The unusually large number of cases of typhoid fever occurring in Fort Collins during the fall of 1900 gave to the physicians of that city an excellent opportunity to study the disease with its various complications. The enormous amount of physical and mental labor connected with the care of so many patients in private families precludes the possibility of that careful study which might have been given to each individual case.

The supply of trained nurses was exhausted almost at the beginning, so that accurate records were impossible.

This report, then, is little more than a record of the general progress of the cases, with such special signs and symptoms as could be observed by the watching friends or the physician during his visits.

This list does not include several cases seen in consultation, but only those directly under the writer's care. It does include, however, several cases taken charge of by Dr. Lee during my enforced absence from the city; also one fatal case which passed into the hands of another physician a short time before death. In this list are included only those cases in which the elevation

of temperature lasted fourteen days or longer and does not include a number of so-called abortive forms in which the prodromal symptoms only were present.

The cause of the epidemic was, by Dr. Mitchell, after a thorough investigation, attributed to the water supply. Several cases of undoubted typhoid fever had occurred at the town of Bellevue, about two miles above the beginning of the ditch which supplies Fort Collins with water from the river. Two of these cases had been seen by the writer in consultation, and together with the other symptoms, the examination of the blood gave a positive Widal reaction. In one of the cases the dejecta were said to have been deposited in a small ditch by the side of the house from whence they were washed to the river. That there was water in the ditch has been denied, but the fact remains that there was at one time five cases at this place, all close to the river, with irrigation ditches above with the natural drainage into the river, so that infection from this source was more than possible. That the water supply was the cause is shown by the fact that only those drinking city water had the disease, while those using well or boiled water escaped. Also the fact that so many were attacked at the same time shows a common source of infection.

Of the one hundred cases here reported, sixty-six were first seen during the fourteen days from November 13 to 27, twenty-two were seen earlier in the season, and the other twelve from November 27 to December 20. Of the twelve, three followed other cases in the same families, probably infected from the former cases.

In this list there are seventy-two families represented; the largest number occurring in any one family was eight. There are fifty-three males and four females.

The average duration of the one hundred cases was twenty-five and six-tenths days. In two cases the temperature was elevated without intermission for fifty days. In eight cases it continued over five weeks; in twelve it reached the normal at the end of fourteen days. The temperature ranged from 102° to 105½°. The highest temperature recorded was 106°, in a case in which the instructions were misunderstood and the blankets following the cold bath were continued.

The ages were from 2 years to 45. Thirty-two cases were under 10; twenty-six between 10 and 20, twenty-six between 20 and 30 and sixteen above 30.

Ninety-six of these cases had been using city water. No connection between the disease and the milk supply could be traced. Many owned their own cows and there was no greater proportion from one dairy than another.

In one of the patients it was the second attack, in another the third, and in the remaining ninety-eight it was the first.

The usual prodromal symptoms were present in most of the cases. Epistaxis occurred in 52 per cent. In one case the hemorrhage was very profuse during the second week, necessitating packing the nares. Cough, headache and malaise were invariably present; in one case a persistent and severe headache continued during the course of the disease. A soreness and stiffness of the muscles of the neck was very marked during the first week in six cases and in these was the first symptom noted.

Diarrhœa was present in only four of the cases. Constipation occurred in ninety-six and was very obstinate in two during the third week.

The typhoid spots were recorded thirty-five times; tympanites in fifty-three cases.

Delirium occurred in twenty-nine cases and lasted from two days to three weeks. The delirium was of the quiet type, and in none was there any evidence of meningitis.

Hemorrhage occurred thirty-nine times in fourteen patients, usually about the middle of the third week. There were six hemorrhages in one patient. In this case there was extreme distention, delirium, subsultus tendinum, with hiccough and dropping of the lower jaw for three days. The patient recovered.

There was hypostatic congestion of the lungs in 8 per cent., pneumonic sputum in 2 per cent.

Relapse occurred in three cases, in each running fourteen days, with an increase in the size of the spleen and tympanites.

The spleen was enlarged in all the cases. Endocarditis was not observed. Myocarditis with intermittent pulse was recorded four times, profuse continued perspiration in ten cases.

Phlebitis occurred in four patients. Acute nephritis followed one case and lasted three weeks.

One patient had a goitre of long standing, which increased rapidly after the fever had left, but the goitre has since disappeared, following an attack of mumps.

There was an ischio-rectal abscess in a child 2 years of age.

Periostitis of the parietal bone followed the disease in one patient, with the formation of pus. The case is still under observation, six months later.

The Widal reaction was present in eighteen of the twenty cases examined.

The mortality was 4 per cent. Hemorrhage occurred in all of the fatal cases. In one there was a general hemorrhagic condition, the blood oozing from the gums, nose, stomach and bowels. In two pneumonia supervened and seemed the immediate cause of death. One died from exhaustion, following a severe hemorrhage.

Treatment.—The routine treatment carried out in these cases was a combination of the use of intestinal antiseptics and cold water.

Calomel in one-tenth grain doses, combined with soda, was given at the beginning every hour, until free action of the bowel was established. Salol in four-grain doses every four hours, beginning with the fever and continuing until convalescence was established, was given. Whenever the temperature was above 102° water was used. First, following the suggestion of my colleague, Dr. Stuver, an enema of from one-half to one pint of normal saline solution, at 50°, was slowly given. This was usually followed by a drop of one to two degrees in the temperature, with profuse perspiration and a large flow of urine. In cases in which the water was not retained or in which the expected lowering of temperature did not occur, the sponge bath of 90°, gradually cooled, was used, followed by a plunge bath if necessary. In only three cases did it seem necessary to use the cold plunge bath of 40°, but in one of these cases it was used every three hours from noon until midnight for five days. The case recovered. In using the cold bath the patient was rolled onto a piece of rubber sheeting, the edges of the sheeting elevated and held in place by pillows forming a trough, and the

water poured in. By this method there was no exertion on the part of the patient and by beginning with water of 90° and gradually cooling there was no shock and the reduction of temperature was prompt and agreeable to the patient.

Strychnine was given in nearly all the cases, the dose varying with the pulse and respiration. Turpentine in the form of hot stupes and enemata was used for tympanites together with large doses of strychnine. Morphine was given hypodermically for hemorrhage, and caffeine and atropine in cases of collapse. For the other conditions as they arose the usual remedies were given.

Diet.—Milk, meat, broths, egg albumen, corn starch, custard and grape juice were given every four hours, the article given depending to some degree on the wish of the patient. In cases of hemorrhage or tympanites the milk was withdrawn and only broths and egg albumen given. Solid food was resumed at the end of eight days of normal temperature.

The value of good nursing did not seem so apparent in this series of cases as is said to be the case by most writers on the subject. In 20 per cent. of the cases there was a trained nurse in attendance. Three of the four fatal cases had a trained nurse from the beginning and the fourth had a nurse during the week preceding the end. The nurses were efficient and attentive, but the patients died in spite of care. Others, apparently in a more serious condition, recovered with ordinary care. In one family seven children and the father had the disease; the sanitary surroundings were of the poorest; two and three occupied one bed. The only care they received, aside from the daily visit of the physician, was that of the mother, who was cook, laundress and nurse. All recovered.

One case occurring in a boarding house developed a temperature of 105°, and was found several times by the other boarders wandering around the hall or lying on the floor, where he had fallen, and carried back to his room. He recovered at the end of four weeks, while another in the same house and with a trained nurse from the beginning died at the end of the third week. Regarding the care, the cases seemed to do best with the care and under the same conditions to which they had been accustomed when in health.

The presence of the trained nurse was at least a great comfort and convenience, but the result seemed to depend more on the severity of the infection and the resistance of the patient than on any external conditions.

The previous history of the patient was of little value in regard to prognosis. Two of the fatal cases "had never had a doctor before," while the other two were in robust health at the beginning.

In reviewing the cases it has seemed to me:

1.—That it is a matter of regret that conditions are such as to make it possible for an epidemic of this kind to occur.

2.—That considering all the facts, the undoubted cause of the epidemic was infected city water.

3.—That there is a greater similarity in cases infected from a common source than in the same number occurring spasmodically.

4.—That a rigid milk diet is not absolutely essential to prevent relapse nor to a low rate of mortality.

5.—That the final result was not affected in either way by the employment of trained nurses.

6.—That the routine use of intestinal antiseptics with hydro-therapy, gives as good results as can be obtained from any form of treatment.

SOME EXPERIENCES WITH VENESECTION.

BY H. B. WHITNEY, DENVER, COLO.

One hundred years ago the subject of venesection would have been trite, to say the least; twenty-five years ago it was apparently a dead issue; while to-day it is again the object of a reviving interest as being one of those few measures which, properly applied, may be the direct means of saving life.

My purpose to-day is chiefly to stimulate interest in and discussion of those indications for venesection which especially relate to certain diseases of the chest.

To the use of bloodletting in apoplexy, in threatened or

fully developed uræmia, or in certain forms of insolation, I can merely refer. Of two children whom I have recently bled for uræmia, one, a child of 2, was in deep coma, and apparently unaffected by the abstraction of six ounces of blood; he lived but three hours. The other was a lad of 8, who, for twenty-four hours had been on the verge of convulsions, and was already amaurotic. After the letting of some ten ounces of blood, he showed slight temporary improvement, but in half an hour convulsions began and continued at frequent intervals for a day. The boy subsequently recovered.

To come now to certain affections of the respiratory and circulatory system: There is one condition in which the signal advantage of venesection cannot be too fully appreciated—whenever, namely, the right heart becomes suddenly and seriously embarrassed. Predisposing causes of such mechanical disturbance will be oftenest, undoubtedly, a valvular lesion, especially mitral; less frequently, a chronic myocardial degeneration and insufficiency, such as may result from chronic emphysema, long continued fevers, coronary disease and general arterio-sclerosis, chronic nephritis, or the various cachexias. Exciting causes are the various forms of sudden and undue strain upon the heart, whether from physical exertion, mental impressions, acute disease, or altitude. These immediate causes are of very great importance; for it is unquestionably in acute cases of cardiac insufficiency, where the muscular substance of the heart has been hitherto able to meet fairly well the demands made upon it, that the greatest triumphs of venesection are to be expected. It is in sudden embarrassment of the heart with overfilling of the pulmonary circulation that the purely mechanical effect of venous deflection can scarcely fail to be of service. The following case will illustrate:

Mrs. C., aged 25, consulted me at my office on October 6, 1898, for mitral regurgitation accompanied by slight œdema. She improved somewhat until the 24th, when, after a long walk, she was suddenly seized with a constantly increasing dyspnœa, accompanied by cough. An hour and a half later I found her with extreme orthopnœa, marked cyanosis and a pulse of 150. After an hour's work with all sorts of stimulants, the patient's

condition was decidedly worse; the lungs were now full of moist rales, there was increasing collapse and abundant expectoration of a blood-stained frothy sputum. Death was impending, and I had little hope of staying its advance. But the removal by venesection of twelve ounces of blood produced an immediate and almost magical change. In five minutes the pulse had dropped thirty beats, and in half an hour the cyanosis and dyspnœa had practically disappeared. The next day the patient was as well as usual, and not long afterwards left for California. I am confident that her life was at least temporarily saved by venesection.

The occasional effect of altitude, even moderate, upon an already weakened heart, and the circumstances under which venesection may be indicated for its relief, are illustrated by the following experience:

Mr. B., aged 37, consulted me first on January 6, 1899. There was a history of pulmonary tuberculosis of nine months' duration; he was, however, in very good general condition, his weight having dropped only from 180 to 168. There was considerable dyspnœa on exertion, which had markedly increased during the twenty-four hours since he had arrived in Denver from New York. I found extensive infiltration of the whole left lung, an enlarged right heart and very slight albuminuria.

I ought to have at once sent this man back to a somewhat lower altitude; he evidently had an impaired heart, under considerable temporary strain. I thought it safe, however, to temporize, and immediately put him to bed with appropriate medication. On the two following days, the 7th and 8th, there was no perceptible change; he breathed easily when at rest and was not cyanotic. Still, I now urged immediate departure, and it was decided that he should go upon the following day, if there was no improvement. On the morning of the 9th I found him in a desperate condition, with all the signs of acute pulmonary oedema—great cyanosis, rapid pulse and respiration, abundant expectoration of a bloodstained, frothy sputum and both backs full of rales. I at once withdrew six ounces of blood—too little, I now believe—and directed that he be taken to the first train leaving for the East. Here, again, the immediate result of venesection was most marked; respiration at once became easy and the cough

almost ceased. Two hours later I accompanied him in an ambulance to the train. But the excitement attending the lifting of the stretcher through the car window brought on a fresh attack of suffocation, with intense dyspnœa and cyanosis, which I thought would prove immediately fatal. The conductor held the train while I again bled, this time a full pint. Unfortunately, the relief afforded was but temporary, and the patient died before the train reached Nebraska.

I cannot presume to take your time by analyzing the various points of interest which this case presents to a practitioner in an elevated region. I would only emphasize one or two of special importance: First—Any marked tendency to dyspnœa on reaching a high altitude should be regarded with the greatest concern, especially where the right heart is found to be enlarged. Second—Where such a case cannot be removed to a lower region venesection may eventually offer the same chance of relief that it does in any other form of sudden embarrassment of the right heart. Third—These cases are, fortunately, very seldom at moderate elevations, like that of Denver; and yet they suggest the necessity of great quietude at first, for all invalids especially who are sent into elevated regions.

A word now about venesection in pneumonia. With the recommendation that it be done at the outset of sthenic cases in robust individuals all will probably agree. In later stages, and particularly in the terminal oedema of pneumonia, the procedure becomes more questionable. We are all familiar with the picture—the rapid respiration, the frequently clammy skin, the soft and rapid pulse, and particularly the cyanotic pallor which, with moist rales, indicate the development of this usually fatal condition. Here venesection is perhaps not to be unconditionally condemned; but I fear that little is to be expected from it. Practically I have never saved a patient by it, nor have I been able to perceive even temporary benefit. If others have had better results, I, for one, should estimate the detailed report of even a single instance at a very high value. In a recent case the pulse was still fairly good when I cut down upon the vein, inserted a canula, introduced a pint of normal salt solution directly into the circulation, and then removed as much blood as I could

get, perhaps four ounces, from the opposite arm. Unfortunately, blood is obtained at this stage with the greatest difficulty, and I have frequently been obliged to open several veins before getting enough to be of any possible service. In this connection it may be interesting to note that Baginsky recently saved the life of a child under such circumstances (not, however, in pneumonia) by opening the radial artery. The above case of my own was apparently uninfluenced by the treatment described, and died some three hours later.

But it seems to me that theoretically, also, we can expect little from bleeding in the final stage of pneumonia. This measure presupposes a certain amount at least of cardiac vigor—the power to recuperate if temporarily relieved of an unaccustomed burden. While we may conceive such a possibility in the event of a sudden extension of the pneumonic process, we usually have to deal with a heart which, in spite of every possible stimulation, has gradually but steadily succumbed. It fails because of inherent weakness rather than because of overwork. Very likely the latter has been an important factor in favoring the development of the condition, but unquestionably the chief element is toxic. In my opinion, any slight change in the total blood volume has but little influence upon such a heart; it has largely lost the power of simple contraction, to say nothing of moving a column of blood. I can see no essential difference between the failing heart of pneumonia and that of typhoid or septicæmia or any other highly toxic condition; and it would appear scarcely more rational to expect relief from venesection in the one than in the other. On the contrary, it may be seriously questioned whether the resulting diminution of blood tension may not be distinctly prejudicial to any remaining possibility of recovery. Certainly the simultaneous introduction of salt solution would overcome this objection, but such a procedure can hardly be called a venesection in any strict sense.

Since nowadays so little is said about blood letting in the books, it may not, perhaps, be out of place to briefly refer to the technique of this little operation. In any fairly robust adult a moderate compression by two or three turns of a bandage about the upper arm will distend the veins at the elbow so that one

of them may be easily opened by a single thrust of the lancet. I usually select the most prominent, whether or not it be the median cephalic. In very fat people, in those with weak circulation, and especially in early childhood the veins are usually much less prominent, indeed often hardly perceptible. But at least a faint blue line can always be detected, and by carefully cutting down upon the vein at this point it can easily be isolated and incised. In this way, too, a good stream can often be obtained when the simpler procedure has failed; either because the opening into the vein was too small, or because its position relative to the incision through the skin had become displaced. A successful phlebotomy should produce a stream with a steady spurt of several inches. A simple sterile pad, firmly adjusted, is all the dressing that is usually required.

In closing these brief clinical memoranda, I would again suggest: First, that conditions demanding venesection are usually of sudden onset. Second, that such cases will usually present, not only cyanosis, but also the local signs of dilated right heart and pulmonary œdema. Third, that the gradual heart failure of acute infections and chronic disease can neither practically or theoretically be shown to be a proper field for venesection.

DISCUSSION.

Dr. Rothwell: I would like to ask Dr. Whitney what sorts of stimulants were used in his cases.

Dr. Whitney: I cannot recall details, but judging from my past experience I probably used almost anything I could get hold of for stimulation. I remember that alcohol and strychnia were both used in large doses. We all of us have had a good deal of experience with dying people and know what remedies are in common use under such circumstances; for example, nitro-glycerine, ether and camphor either subcutaneously or otherwise. I had no time to get oxygen. I have no doubt whatever that my patient would have died had venesection not been done and that it is at times one of the most important remedial measures at our disposal.

SUCCESSFUL CASE OF TALMA'S OPERATION FOR ASCITES IN CIRRHOSIS OF THE LIVER.

BY M. BALLIN, M. D., LEADVILLE, COLO.

Cases of surgical interference for ascites in consequence of cirrhosis of the liver are as yet by no means common. There are only about twenty to thirty cases of this operation on record in the literature of the scientific world. As yet this operation has not gained any distinct position concerning its value, and for this reason I consider myself justified in placing a record of a successful case before the profession.

Medical journals have spoken quite often lately of this operation, giving history and rationale of the same, so I will be brief in giving a review. Talma was the first who suggested the idea of the operation, but Drummond and Morrison were the first to execute it in practice. Still, the operation seems to be familiar in the profession under the name of "Talma's operation."

The idea of the operation is to relieve ascites due to obstruction of the portal veinous system by providing means for a new collateral circulation. This is an event which had been observed in some cases spontaneously taking place. Further, it was shown by experiments on dogs, especially by Kusnetzow, a Russian physician, that a primary fixation of the omentum to the parietal peritoneum enabled dogs to withstand double ligature of the portal vein, an otherwise fatal operation. (Annals of Surgery, May, 1901.)

The operation on man is the same as the one mentioned in the above experiments. A new circulation is provided for by means of stitching the omentum to the parietal peritoneum, so that the blood can go back to the heart with exclosure of the portal veinous system via omental and abdominal veins.

Packard and Le Conde reported from the General Literature twenty-two cases. (American Journal of the Medical Sciences, March, 1901.) I could find four more cases; Koslowsky

(Central Blatt fuer Chirurgie, 1901, No. 16), three cases; and Frazier (American Journal of Medical Science for December, 1900), one case.

The mortality of these cases averages about 10 to 12 per cent., the successes 35 per cent.; but I mention right here that the rate of success seems to be much larger in cases of pure cirrhosis of the liver where there is no considerable degeneration in other organs.

I will give in brief now the history of my case:

J. I., 53 years old, a native of Ireland, comes from a healthy family, was never sick. His occupation was that of a miner, but for seven years (which is important from an etiological standpoint) has been in the saloon business, and at several times has had short periodical drinking spells. Two years ago he got rheumatism in the ankle and knee joints; after that, dropsy of feet and hands. I first saw the man on February 26, 1900, and found then dropsy of the legs, ascites, albuminuria, etc. Digitalis and diuretin gave him some relief. In the summer of 1900 Mr. I. went to Glenwood Springs, Colo., but found little improvement by the use of the baths, etc. In October, 1900, ascites became so large that he could hardly walk, and I therefore tapped him on October 12, 1900, removing about five gallons of water. The relief was of short duration, the water returning in about one week. On November 19, 1900, the tapping had to be repeated, about the same amount as the first time being removed. December, 1900, the patient returned to me in about the same condition that he was in four weeks previous, before the last tapping, and even more ascites than before, the circumference of the abdomen being fifty-two inches. His legs were not swollen to any amount; there was not much of pericarditic and pleuritic exudations; the urine was free of albumen; some arteriosklerosis.

I considered the case a pure cirrhosis of the liver, and tapping giving only temporary relief, I recommended to the patient a trial of Talma's operation, which I performed on January 2, 1901. On the day previous to the operation I removed two gallons of water from the hyperextended abdomen. A mild chloroform anæsthesia was administered. An incision two and one-half inches long was made in the middle between the navel and

xiphoid process. The omentum was easily caught; the parietal peritoneum was gently scarified with a knife in a semicircle around the upper angle of the incision, and then the omentum was sutured with four stitches to the scarified region. The wound of the abdominal wall was closed in the usual way.

The recovery was a splendid one. The patient left the bed in two weeks, and the hospital in three. The ascites returned only slightly during the first weeks after the operation, and diminished afterwards continuously and completely. The general result to-day is a surprising one. The ascites has never returned, the circumference of the abdomen being thirty-five and one-half inches against fifty and more before the operation; there is no dropsy of the legs; the urine is free from albumen, and the liver reaches only a little over the rib bow. The man is able to attend to his business, and is feeling well in every way. Only a mild jaundice of the conjunctive reminds one of the serious degenerative process in his liver.

This good result has continued now for seven months, an event which is certainly a success considering that the patient had to be tapped three times in three months previous to the operation, and that if the puncture of the ascites had to be continued at the same rate the patient, after our experience with non-surgical treatment, would have succumbed some months ago.

My intention by the publication of this article is to show that Talma's operation is surely to be considered in our attempts to relieve ascites in consequence of liver cirrhosis, where puncture and internal treatment usually fail.

In looking over the literature, I believe that only cases of pure cirrhosis of the liver gave results like the one in my case. All cases with serious degeneration of the kidneys, heart and blood vessels are to be excluded.

DISCUSSION.

Dr. Craig: I have no knowledge of this subject other than that it is a new operation and certainly worthy of every trial. I believe it has been tried by some surgeons in Denver. I think among the number can be included Dr. Clayton Parkhill, who is present and can speak for himself.

Dr. Cochems: I would like to ask Dr. Ballin if there were symptoms of tuberculosis of the peritoneum at the time of the operation.

Dr. Ballin: It was quite thick, though I could find no signs of tuberculosis.

Dr. Lobingier: Harris suggests denudation of the parietal peritoneum lying anteriorly and the implantation of the roughened omentum directly on the denuded area. In the case which he operated the epigastric veins dilated rapidly, establishing free circulation and the patient made a good recovery. Although Talma has emphasized the feasibility of this operation the credit of its suggestion belongs properly to Morrison, Talma's case being the ninth. Failures are more often the result of poor judgment in the selection of cases. Where prolonged right heart and pulmonary disturbance has existed from obstruction due to a densely fibrous liver, neither this nor any other operation will relieve the patient. The case should be seen before extensive and extreme contraction has occurred. Numerous aspirations are unfavorable and should be avoided. The patient should be operated early in order to promise relief.

THE PRESENT EPIDEMIC OF SMALL-POX THROUGHOUT COLORADO.

BY U. D. M'DOWELL, M. D., LONGMONT, COLO.

"If 'twere well 'twere done, 'twere well 'twere done quickly," and if between trains from Nebraska and Utah I can entertain you with a short paper on a pock-marked subject I trust I will escape the imprecation of Katharine to Rosaline in 'Love's Labor Lost:"

Rosaline—'Ware pencils, ho! Let me not die your debtor, my red dominical, my golden letter; O that your face were not so full of O's.

Katherine—A pox of that jest! and I beshrew all shrows.

If the fair Katherine were living to-day and addressing her

fellow maid to the Princess, little would she be able to say about her disfigurement.

As the medical inspector to the State Board of Health of Colorado, it has been both my pleasure and good fortune for the past five months to be able to study, clinically and otherwise, the given proposition: "Is this epidemic which is now widespread in the state of Colorado variolous or otherwise If variolous it is not otherwise; if otherwise, what shall it be named?

It has also been my duty as a general practitioner of medicine in the northern part of this state to deal more or less with this contagium for the past two years and one-half.

There has been a widespread opinion among the laity as well as the profession that this disease is a kindred of or a member of a bygone dream of royalty, inasmuch as with the new possessions we have also received a taste of the legitimate accompaniments.

The Supreme Court of the United States of America has held that the flag does not follow the constitution, and I presume if the State Boards of Health of the individual states comprising this government had had a chance at that decision prior to its promulgation the general voice would have been that the ailments of man did not necessarily go with new territory. I am certain that the mention of this disease would have been an intentional oversight in the deed of transfer.

However, the assertion that this is of foreign origin is as weak, if not as entirely unsatisfactory, to the man who has to face the thing day after day as the attempt to explain it on the grounds of atmospheric waves which sweep from the beautiful Atlantic to the placid Pacific.

One is tempted to be empirical after months of dealing with a disease that refuses to act in accordance with the dreams of regularity described by the lecturer, and yet this mongrel type of small-pox is not without honor even though it is said it is away from its natural haunts. The dogmatic lecture you have listened to in the dim and distant past on the subject of variola had better be called up, for if it were to appear to you in a dream as vividly as it impressed itself upon your eager tympanum in the days when your goal was the coveted diploma you would

at once recognize that your opposition to a native product is not only anti-American, but a direct libel to historical fact.

Antonio Pigafetta, in the Arber edition of "The First Books of America," says: "In al the Ilandes of this Archipelagus rayneth the disease of Saynt Iob (which wee caule the frenche poxe) more than in any other place in the worlde."

The impregnable fortress justly our own by reason of social and community preferences, however, lead many of us to adopt a dictatorial habit in the practice of our profession, and if the truth were known many who have persistently ascribed this cursed disease to foreign origin have no intention whatever to cast aside such authoritative information as is given us by such able men as William Welch and James Nevins Hyde.

I do not think that Bacon, when he said: "To say where notions cannot be fitly reconciled, that there wanteth a term of nomenclature for it, is but a shift of ignorance," would at all apply to the medical profession in toto.

The opportunity to study this disease clinically in practice is afforded to the few as the same opportunity is afforded to the few in medical college. The same can be said of scarlet fever and diphtheria. Any one of this tripod is enough to frighten the average medical student out of the room, since he for some reason is a sort of a mental breeder of ailments under ordinary circumstances, always willing and ready to have at a moment's notice the last disease lectured upon by the professor of practice. Hence we find many of our brother physicians going out into the world with an undemonstrated lecture the more important points of which have, ere the period of starvation is over, vanished with his patience. Every now and then during this period of starvation a journal has reached him, the class of which you will readily recognize when I call to your mind the "Medical Short" with an able article on "The Arkansaw Jiggers," by Herr Aesculapius Burro, of Spike Buck Center, in which article the labored effort seems to be to promote the idea that he has discovered something while sleuthing around with his gum boots on. This same discovery resembles but is not exactly what it used to be. I was informed not a week ago that a suspect had something but it was not small-pox.

The study of the disease now epidemic in this country is, strange to say, notwithstanding information received to the contrary, the study of modified small-pox, as is beautifully described in Hartshorne's Reynolds System of Medicine, published in 1879. There is nothing new or startling, neither is there any reason to take exception to the assertions made by James Furness Marson, F. R. C. S., who describes small-pox after vaccination in a most scholarly way. The effort of the physician to teach his patient has been most deplorable. The effort of the patient to override the careful has been lamentable. Backed by the doctor, the disease has been allowed to reach such proportions as to become a public scourge rather than a family affliction. Long exposures have not been necessary in order that it might grow to proportions bothersome, but in many instances in this state the most trivial and transient associations have given rise to the development of the disease. Neither has the disease so developed been in the least atypical of the original, and since this is a fact proven by methods other than theoretical you must readily admit the existence of the true variola, as we well know that medicine to-day stands ready to interfere with the development of more things than small-pox. And why is it that of all the diseases we are willing to single out probably the most amenable by reason of the advance in medicine and admit to the public that we have no means of modifying the course or development of the disease? The course of the epidemic to-day is in nowise different from the course of an epidemic historically distant.

We have the period of incubation of twelve to fourteen days, during which time the most prominent feature or symptom is the backache, attended by the concomitant symptoms of chill, nausea, occasional vomiting and headache. The backache is the time-honored pathognomic symptom of this disease, and no matter what new frills we are enabled to give the disease I presume it will always be among the first on the list. No man who has ever experienced it, I am informed, will ever be able to entirely eradicate the memory of it. At this time the fever may rise either to a very high degree or it may, on account of the major pain, be less noticed than under the fever of any ordinary attack. However, it is not a wise procedure to depend on your

patient's word, since he may think more of his lumbar distress and he may inform you that he has had no fever of any consequence. The thermometer will show a temperature seldom less than 102° F. on the first and second days. Usually as early as the second day the patient will complain of a pharyngitis, and if you will examine his throat you find a distinct maculo-papular eruption, the same on his penis at this time. This eruption is first noticed on the soft palate and the pillars, but in a very short time is extended toward the front. This I have found has invariably appeared prior to the body eruption. And I would call your attention to the fact that when this eruption appears after such symptoms as chill, backache, with a history of exposure, you are warranted in getting a supply of small-pox reports from the State Board of Health.

Varying from the seventy-second hour after the invasion to the fourth day there will be noticed along the line of the hair and very shortly over the entire forehead a roughness, which in a few hours takes on a shotty feel. This will also be found on the palmer wrists. From these exposed parts the eruption extends over the entire body, but at this time I know of no reason for doubt in the diagnosis. What may transpire after this time will be simply corroborative, and while I am accused of sending a man to the contagious hospital who went no further with his symptomatic developments, I still retain the personal satisfaction of having done as I would expect you to do after such an array of indisputable evidences. With the oncoming of this eruption the temperature drops and in forty-eight hours the top or summit of each papule is filled with a clear fluid which cannot be emptied as in varicella because of the loculated vesicle.

And just here, gentlemen of the State Society, I want to pause and ask you why you should await the further developments in order that you may ascertain to a certainty what you have to deal with. You have had your prodromal symptoms without practically anything more than an usual and expected modification not in variation or in alteration, but in a necessary abatement or reduction; a principle of moderation, the direct result either of personal or hereditary vaccination, or of a long ancestry of pock-marked forefathers. The disease has been,

after one hundred and four years of persistent vaccination, inoculation, infection and patient endurance proven to be the least of our troubles as far as mortality is concerned, for we have seen it in the past epidemic in a most modified and moderated form, a proper mean between the two extremes.

And why do we question the true and try to attribute this to a new invasion of a foreign origin? We have recognized since the first the right of the profession to an empirical reliance on the pathognomonic symptom. We have spent hours in the study of pathology, the science of diseases, and for what purpose but that we might become more proficient in the treatment of a given condition according to our understanding of the causes leading up to it.

Now in this small-pox, be it modified, moderated or mitigated, we are bound by the oath we took: "I swear by Apollo the physician, and Aesculapius, and Health, and All-Heal, and all the gods and godesses that, according to my ability and judgment, * * * to reckon him who taught me this art equally dear to me as my parents * * * I will impart a knowledge of the art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath, according to the law of medicine, but to none others. I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. * * * While I continue to keep this oath unviolated, may it be granted to me to enjoy life and practice the art, respected by all men in all times. But should I trespass and violate the oath, may the reverse be my lot." to at least respect the teaching of our superiors in the days that have gone by.

We have in the papular stage, at the end of from the second to the fourth day, a condition which is laid down in any work of twenty-five years ago. The same exists to-day, and it is for this reason that I call your attention to this stage. Unlike any other disease mentioned, you have a universal demonstration of the Grissolle sign, for the reason that a small-pox papule is developed beneath, and like a conical projectile is plainly pushed up against and stretches the outer skin so that it becomes unnecessary

for you to place your fingers on either side to determine its tendency to disappear. The induration is present, it is tangible, and no attempt is necessary to increase its resistance or determine its presence. It becomes, on second thought and after investigation, either something or nothing, and here is where the Christian Scientist has an opportunity to assert that matter is not. For every result we have a cause. The cause of this peculiar phenomenon is simply that there exists within some reasonable degree of certainty an inflammation somewhere in the locality of this papule giving rise to the induration, and it cannot well be in a structure so scanty of vascular supply as the dermis, hence I am led to believe that notwithstanding the irregularity in the development of two or more of these papules, as regards the degree of perfectness, there does not exist nor can there exist a true small-pox papule or pustule which does not to a greater or less extent involve the cutis vera. This, gentlemen, is the feature that exists to-day and has always existed in a variolous eruption, and our attempts to emasculate the old-time small-pox have not entirely been successful. Herein have we the true feature of differential diagnosis, for in varicella is not the vesicle easily destructible, while the true variolous postule is tenacious even up to the point of actual decay about the ninth or tenth day of the disease in this epidemic.

As you find your index finger indispensible in the discovery of many other conditions, so you will find the same to be true in this epidemic, always bearing in mind that from **dirty nails** we may have an identical condition from the simplest eruption having been poisoned by violent contact, but at the same time there are parts of the body that are unlikely to be reached by the nails, and it is here that you must look when in doubt. I am free to say that with the prodromal symptoms mentioned in an epidemic of this disease I should have no hesitancy in keeping apart from all others any one showing these symptoms.

The symptoms that follow the papular are always more or less irregular, and on this account the diagnosis having been suspected is laid aside. But as a general thing pustulation can be depended on about the fifth day, after which, with a varying development the postules shrink, dry up and become crusts more

often after the manner of the development and by the rule of priority. Dessication is rapid and the destruction of the skin seems to be proportionally moderate. However, I have seen some cases where destructive sloughing of the nose and ears has followed this disease.

The umbilication of the vesicle in its last hours and the pustule in its early development is by no means regular and is neither to be expected nor depended on, as only a few of the more typical cases have shown it. A great number of physicians have called my attention to this fact, and there seems to be an impression that without the umbilicated pustule of early days there can be no small-pox. I have also had this expression used in many instances: "Doctor, it is not small-pox, but it is something." There is neither assertion nor is there denial in this, and yet there is a disposition to treat it trivially when such doubt can give rise to an expression of uncertainty.

The comparative rarity of this disease prior to this epidemic, and the meager opportunities to study it clinically, aside from the time card instruction given by our college instructors, has been responsible to a great extent for the variegated opinions offered on this subject. Then, again, the physician is not entirely culpable, since it has been heralded from the Atlantic to the Pacific that this epidemic is strictly atypical, and without that easy grace of self-confidence which attends the physician generally he is found approaching the bedside with, first, a prejudice; secondly, either absence or scarcity of the causative environment; thirdly, a personal dislike of a repulsive disease of that nature; and fourthly, an uncertainty by reason of the authoritative information. He has probably practiced for years and it has never been his misfortune to have been called before to treat a disease which we must all admit occupies no place in our preferences. It may be that he has never fixed his mind upon its kaleidoscopic and yet gradational symptomotology. Or it may be that he either does not retain or has not had during his student days that most impressive picture that it is the good fortune of the practitioner to retain, the forced and indelible clinical lesson from which he at the time had all the psychological temptations of the Savior of the world to escape. 'Tis hardly

possible that he may be passive in interest, and yet to one who from force of environments is compelled to see and study the beautiful train of variolous symptoms, the gradation is as regular and orderly as the sequence in the great American game or as taxomonic as the progress from monkey to man.

Probably the most Potipher's wife temptation is for the medical man to refuse to entertain any other than that this form of trouble is an irregular varicella, and yet at the same time I am frank as well as loath to say that the wiser of the skeptical profession refuse to deny its variolous nature, and many if necessary have, when pushed for a name, gently dropped the subject by calling the disease one of the many luminous misnomenclatures. This vast list includes such fantastical efforts as "Cuban Itch," "Elephant's Itch," "Bumps," "Puerto Rican Chicken Pox," "Arkansaw Jiggers," "Philippine Measles," and lastly, but I imagine not the final attempt, "Manila Scratches." Now, if in the present state of medical advancement it is wise to permit such travesties to go unnoticed and unpunished I would be glad to ask you in the name of professional honor and dignity what the profession is coming to. If by adjectiving the name of each new colonial possession to some disease of innocent childhood we are to have sprung on the society each year a new topic for discussion, then the society is to be congratulated in advance for its tendency to find the new rather than to discuss the ways and means of conducting the old, which I find is yet giving a large and prominent portion of each community a fair support. The destruction of the fairest dreams of childhood in depriving them of the pure, old and unalloyed measles, mumps, itch and chicken pox, by the unhappy hitching on of such descriptive terms as dog, hog, hyena, buzzard and wolf, will sooner or later demand, as the term elephant itch denotes, an imperialistic expansion to terms mastodonic in their proportions.

Madame Pompadour, the chief mistress of Louis XV, of France, influential in politics, foreign affairs and fashions in her country, once gave as a safe rule: "Be not the first by whom the new is tried, nor yet the last by whom the old is laid aside."

DISCUSSION.

Dr. Tyler: It seems to me that a little discussion of this subject is important. My individual experience in traveling about the state for two years in making a diagnosis led me to believe that the chief cause of mistaken diagnosis was a desire on the part of the physician not to believe that he was dealing with small-pox for fear that his patient would have to be quarantined and that his community might suffer from the statement. As a consequence many new names were coined for the disease, such as Cuban itch, cedar itch, pustular chicken-pox, globular chicken-pox, etc. In the majority of cases one's attention to the history and to the character of the representation easily settled the question of diagnosis. I recognize, however, that there have been some cases which were so atypical that a correct diagnosis was very difficult.

Dr. McDowell: I have stated in my paper that I am a believer in vaccination. I wish to acknowledge the use of and thank Bacon, Shakespeare and Antonio Pigafetta for quotations used.

OESOPHAGOMETER.—A NEW DEVICE FOR MEASURING THE LENGTH OF THE OESOPHAGUS IN THE LIVING.

BY C. D. SPIVAK, M. D., DENVER, COLO.

The cardia or the œsophageal opening of the stomach is the will o' wisp of the digestive tract as far as the living subject is concerned. Nobody doubts the existence of an opening between the œsophagus and stomach called cardia, but its whereabouts eludes the investigators like the North Pole.

The anatomists, the clinicians and the gastro-entenologists have variously located the cardia in different altitudes, latitudes and longitudes, with reference to vertebræ, ribs, cartilages, sternum, liver, diaphragm and what not. Morris[1] finds it opposite the ninth dorsal spine. Gegenbauer[2] came across it behind the

left seventh costal cartilage. Quaim[3] claims for its habitation four or five inches posterior to the interval between the ensiform process and the inner end of the seventh left cartilage. Hemmeter[4] asserts that it is found at the level of the twelfth dorsal vertebræ. Boas[5] is content with the statement that it is situated two or three centimeters below the diaphragm. Einhorn[6] is sure to have met it in the left porasternal line somewhat above the ensiform process. I could enumerate a dozen more writers whose description of the position and relations of the cardia would differ from those just mentioned and from one another. And no wonder. The discrepancies in the anatomical position of the cardia is not due to faulty observation but to the variations in the length of the œsophagus and position of the stomach, two organs which do not remain stable even within physiological limits. Mehnert[7] found that the length of the œsophagus is influenced by bending or stretching of the neck, by the condition of the stomach whether full or empty. Strauss[8] asserts that the œsophagus can be stretched fully one-eighth of its entire length. It is self understood that in pathological condition like total displacement of the stomach in either direction, neoplasoms in the œsophagus or external to it, old age, abnormally tall persons, etc., the length of the œsophagus will vary, and therefore the position of the cardia will vary accordingly. The average distance, from the incisor teeth to the cardia, as given by Vierordt, Sahli[9], Morison[10], Strauss[11], Rosenheim[12], Quain[13], Gray[14], Testut[15] and others, is 40 centimeters, or 16 inches. The distance between the incisor teeth to the cricoid cartilage,—the beginning of the œsophagus proper,—is subject to but insignificant variations, and can therefore be considered as measuring 15 centimeters or about 6 inches in all subjects under all conditions. Gumprecht[16] gives higher figures, 41 to 48 centimeters. Rollestone[17] gives lower figures, 15½ inches. McCaskey[18] gives the widest extremes, 38 and 52 centimeters. The author[19] has reported before the American Gastro-Enterological Association, May 1, 1901, a case of carcinoma of the cardia in whom the obstruction was encountered at a distance of 52.5 centimeters (21 inches).

The question will be asked, is there, besides the scientific or theoretic value, also a clinical or practical value in ascertaining the length of the œsophagus? The answer is in the affirmative. It is important to know when the stomach tube or any other intragastric instrument has passed the cardia for the following reasons:

1. In severe gastric lesions it is important to know how much of rubber tubing should be allowed to enter the stomach.

2. In both gastroectasis and gastroptosis the greater curvature is found lower than in the normal, and therefore the differential diagnosis will rest upon the position of the cardia. If the cardia is in situ we have to deal with a dilated stomach. If the cardia is low, the stomach is displaced.

The following methods are used for ascertaining the length of the œsophagus:

1. The distance is measured outside of the body by applying one end of the tube or sound to the line of the incisor teeth and the other end to the xyphoid appendix of the sternum, giving the tube a curve approximately corresponding to that made by the mouth and pharynx.

2. The following procedure is employed in Kussmaul Clinic: The sound is introduced into the mouth until it meets with the resistance of the posterior wall of the pharynx. It is then taken out and applied externally from behind the lobe of the ear down to the tenth dorsal vertebra. The sum of the two measurements represent the distance between the incisor teeth and cardia.

3. Strauss[20] recommends to measure the trunk, from the incisura thyroidea to the symphysis pubis. The œsophagus has been found to be two-thirds of this length.

4. Rosenheim[21] measures from the spine of the second cervical vertebra to the point of attachment of the left twelfth rib to the twelfth dorsal vertebra, to which should be added the distance between the incisor teeth to the uvula.

5. Van Valzah and Nisbet[22] measure the distance from the ninth dorsal vertebra along the spine and side of the neck to the front of the teeth.

6. Purjesz[23] attaches a manometer to the distal end of

the stomach tube. The instant the tube passes the cardia is indicated on the manometer by a sudden relaxation of pressure.

7. Schreiber[24], Rosenbach[25] and Turck[26] introduce into the stomach a tube to the proximal end of which is attached a collapsed rubber ball. The ball is then inflated with air and the tube is withdrawn until it meets with resistance, and the distance is noted.

8. McCaskey[27] uses an instrument (cardiameter)*** which is based on the principle of Schreiber and Rosenbach's inflated ball. In the proximal end of a soft Goodrich colon tube he placed a tightly fitting piece of metal tubing over which was adjusted a small bag of very thin rubber. To the distal end is attached a closed rubber bulb. The tube, with rubber bag collapsed, is introduced into the stomach and is then expanded by compressing the bulb. The tube is then withdrawn until the impact of the rubber balloon is felt against the cardiac orifice. The distance is read off on the centimeter scale.

9. Turck[28] uses his gyromele (revolving sound) for ascertaining the length of the oesophagus. The gyromele is introduced into the stomach, and as soon as the vibrations of the rotating end becomes palapable, the sound is withdrawn until the sponge attached to its end meets with "slight" resistance at the cardia. The distance is noted at the point of the incisors by a tightly fitting movable rubber ring.

I do not care to make an exception to the time honored rule adopted by all who devise a new instrument, namely, to assert that all the methods and devices hitherto used possess many disadvantages and that the only perfect instrument is the one devised by the author. In view of the fact that the length of the oesophagus is by no means a constant unit, it is obvious that it is needless to comment upon the inaccuracey and fallacy of the methods 1, 2, 3, 4 and 5, which employ external measurements. Methods 7 and 8 are objected to by Turck as unreliable, and rightly so, for the reason that the inflated ball occupies a gastric funnel shaped portion of the cardia, thus meeting the resistence of the gastric walls and not of the cardiac orifice proper. The resistance at the cardiac orifice when using Turck's gyromele with a regular sponge attachment is almost nil. The use of a

cone pledget of cotton or wool (covered with rubber) would be one of the things "difficult to swallow."

My method is based upon the principle of accoustics that sound is produced by the vibrations of air, upon the fact that the stomach is a hollow organ containing air, and that the œsophagus when not in the act of swallowing is an air tight organ. Hence a musical instrument when introduced into the oesophagus will produce no sound whatsoever throughout the whole of its length, but as soon as the musical instrument will reach the threshhold of the stomach, the cardia, it will emit a sound.

My devise consists of a stomach tube provided with a whistle. The whistle is inserted at the proximal tube in such a way that an opening of the whistle through which the air is blown in looks toward the distal end, and the opening through which the air makes its exit is in apposition with the side opening of the tube. To secure the whistle in the tube it must be tied with catgut or silk. The tube is introduced into the œsophagus, and air blown in by means of a pump, Davidson syringe, Politzer bag, mouth or what not. As long as the whistle traverses the œsophagus the instrument is "smothered," and no sound is heard, but as soon as the cardia is reached a distinct whistle is heard. The tube can be pushed forward and backward several times so as to ascertain the exact point at which the whistle is heard. The distance between the distal border of the side opening of the tube and the point at the incisor teeth where the whistling sound was first heard represents with precision the distance between the incisor teeth and the cardia.

The advantages of this device are:

1. Precision not attainable by any of the other methods except by that of Purjesz.

2. Cheapness. The material necessary for manufacturing this instrument are (a) a stomach tube, (b) whistle and (c) a piece of thread. It does not take more than two minutes and it is ready for use.

3. No special instrument is needed. It is an œsophogometer only when used for the purpose of œsophogometry.****

In a twinkling of an eye the component parts are separated and we have our stomach tube and whistle ready for other uses.

**I use the word distal and proximal with reference to the patient.

***Cardiameter is not the right name for an instrument for measuring the length of the œsophagus, or the distance of the cardia from the incisor teeth. Cardiamenter means an instrument used for measuring the cardia, but the cardia has only a transverse measurement.

****I am at present investigating the auscultatory phenomena of the œsophagometer during its sojourn in the stomach and hope to be able to demonstrate in the near future the value of the whistle as an aid to diagnosis in more than one way.

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DISCUSSION.

Dr. C. A. Powers: I have listened with much interest, Mr. President, to this interesting paper. The variations in the normal length of the œsophagus are of course very great. An

accurate measurement of the exact length of the œsophagus is of much importance. Dr. Spivak very modestly refrained from mentioning a case which it was my fortune to see with him some months ago. The patient was a man five feet four inches in height, a patient of Dr. Jayne and Dr. Bonney. The bulbs passed easily to a distance of nineteen inches and there met obstruction. I believed that the instruments must be in the stomach. Dr. Spivak thought otherwise, and he was right and I was wrong. The autopsy showed that the obstruction was just at the cardiac end of the stomach; the œsophagus was unusually long. I think that this invention of Dr. Spivak's is an ingenious one.

EGG MEMBRANE AS AN ARTIFICIAL TENDON SHEATH.

BY AUBREY H. WILLIAMS, M. D., DENVER, COLO.

When an inflammation occurs along the flexor or extensor tendons below the annular ligament, the tendons, sheaths and surrounding tissue alike are involved; and in the reparative process become more or less firmly bound together by fibrous adhesions. This limits the movement of the tendon which exercises its perfect function only to the point where the fibrous attachments begin. Below, the movement is directly governed by the amount of adhesions which have taken place. Be the adhesion slight or extensive the perfect action of the tendon is never fully restored and correspondingly the utility of the digit or digits impaired.

Operations for the removal of the cicatricial mass are not as satisfactory as we could wish, for the tendon, bared of its protecting sheath, again unites with the surrounding tissues by the same process, and notwithstanding careful and persistent massage the limitation of movement to a greater or lesser degree remains. It requires no exhaustive research into surgical literature, wofully incomplete as it is in matters pertaining to this

most useful member, to prove this fact, for we meet in our every-day lives monuments to our heretofore inability to correct this lamentable condition. In incised wounds, where the severed ends of the tendon may be picked up, united, and uncomplicated by infection little or no limitation of movement follows, but where the tendon sheath has been destroyed, the mere uniting of the tendon will not suffice and an artificial covering of some non-absorbable substance, which, at the same time will not remain as a foreign body, must be used as a substitute for nature's covering.

Dr. Leonard Freeman, of Denver, in a series of interesting experiments on dogs and rabbits, demonstrated that egg membrane, when placed between the scalp and dura prevented adhesions from taking place; and further, in the course of four weeks that the membrane as such had lost its identity and in its place a thin tissue, fibrous in nature, had formed. Both surfaces of the membrane were smooth and glistening, showing no adhesion between it and the surrounding tissue.

The three cases in which I have used egg membrane as a covering for the denuded tendon show two recoveries and one failure due to infection. Rigid asepsis in the preparation of the patient and in the sterilization of the membrane are vastly more important than the mechanical placing of the membrane, for the slightest infection, even that arising from a stitch abscess, will cause a complete failure. The tendons, especially those of the dorsan of the hand, lie so close to the cutaneous surface that an interrupted suture when applied will come in contact with the covering membrane, and any infection along the suture line apt to be conveyed to the tissues below. This took place in one of my cases, and to it I attribute the failure. The usual method of preparing the membrane, that of scrubbing and placing the egg in a 1-500 bichloride of mercury solution before removing the shell, is faulty, as is shown by the following experiments: The eggs were thoroughly scrubbed for five minutes, placed in a 1-500 bichloride of mercury solution, after which the bichloride was precipitated with ammonium sulphide. Ten cultures in all were made, six on blood serum and four in gelatin. At the end of forty eight (48) hours four gelatin cultures negative. Five

blood serum cultures showed in all thirty-three (33) colonies; one culture negative. At the end of seventy-two (72) hours two gelatin cultures positive, two negative. There is, therefore, no doubt that egg membrane prepared in the usual manner is not sterile, and to this may be attributed the suppuration which has followed in some cases where it has been used in brain surgery.

One case is reported where suppuration came on fifteen days after the operation, proving beyond a doubt the faulty preparation of the membrane. My method of preparing it is to scrub the egg thoroughly, place it in alcohol to remove the oil which is always found in the shell; afterward place in a 1-500 bichloride of mercury solution and finally in sterilized water. I then remove the shell, cut the membrane into strips one-half an inch in width and boil them for five minutes, allowing them to remain in the original water until used, thus avoiding contamination from unnecessary handling. The membrane thus prepared is applied in a spiral manner, each spiral overlapping the preceding one sufficiently to hold it in place. The pressure from the sutures and dressing being sufficient to retain it until fibrous contraction takes place.

Since the avoidance of infection is so important to the success of this operation, I wish to emphasize one thing. During the operation we should avoid handling the tissues with ungloved hands, and employ instruments in preference to fingers.

Case 1. Mr. W., age 52; telegrapher; family history negative. Two years ago a small indurated ulcer began over the middle of the dorsan of metacarpal region of the index finger of the right hand. A diagnosis of epithelioma was made by Dr. W. H. Davis of this city and by him removed with Marsden's paste. In the removal of the epithelioma the extensor tendon was destroyed from the carpo metacarpal articulation to the metacarpo-phalangeal joint. Wound healed by granulation, showing no indication of epitheliomatus tissue remaining. The finger remained flexed though not anchylosed. He was referred to me July 10, 1900, for operation. An incision extending along the entire metacarpal bone revealed a total destruction of the extensor tendon with its sheath. A similar incision was made over the middle finger and the tendon exposed. Half of this tendon was

withdrawn from its sheath, passed through an opening connecting the two incisors at their upper angles, drawn down and united by cat-gut sutures to the distal extremity of the destroyed tendon at the metacarpo-phalangeal joint. Around this was wound in a spiral manner the egg membrane. Wound closed by interrupted sutures and the hand immobilized. In eight days the skin sutures were removed. At the end of two and a half weeks passive motion was begun and continued at intervals of three days. At the end of four weeks he could open and shut his hand normally.

Case 2. Mr. H.; age 42; miller. Six months ago an incised wound severed both flexor tendons of the middle finger of the right hand. Suppuration followed with total loss of flexion of the middle finger. He was referred to me November 19, 1900. The middle finger extended but not anchylosed. An incision extending from the terminal phalanx to a point just below the palmar arch revealed a total loss of the tendon up to that point. The cicatricial mass was dissected up from the junction of the second and third phalanges. This improvised tendon, together with a reinforcement from the flexor sublimis of the index finger, was united to the proximal end. It was then covered with egg membrane in a spiral manner; the wound closed with interrupted sutures and the fingers dressed in the flexed position. At the end of seven days sutures were removed with no indication of suppuration save a slight redness around one of the sutures. At the end of the twelfth day the finger became swollen and tender. On separating the lips of the wound pus was evacuated. Suppuration continued until the egg membrane was removed on the twentieth day. Result was only partial ability to flex the finger.

Case 3. Mr. J.; age 30; machinist. Six months ago sustained a wound on the back of his left hand, followed by extensive suppuration. June 3, 1901, he came to me, requesting an amputation of his little finger. On examination he was able to flex the finger only one-half owing to the extensive adhesions around the extensor tendon. January 4 the tendon, intact, was freed from its adhesions and partial anchylosis broken up. The tendon was covered with egg membrane in the usual manner

and the wound closed by a sub-cutaneous suture; the hand dressed with the finger extended. At the end of a week sutures were removed and in two weeks passive motion began. At the end of five weeks the function of the finger was absolutely restored.

DISCUSSION.

Dr. Lobingier: While I have had no experience with the use of sterile egg membrane as a substitute membrane or sheath, the dense fibrous structure of this tissue will fully bear out the adaptability of it as an artificial covering. Dr. Williams has emphasized the necessity of thorough sterilization, and it should be remembered that the necessity is just as great that the field to be operated and into which the membrane is implanted, should also be sterile. Just how the membrane becomes incorporated as a fixed sheath is not explained by the speaker; but if I understand him correctly, after trephine operations the periphery of the substituted membrane was absorbed and its place taken by true connective tissue, while in the center the membrane was intact. This would point to a definite proliferation, in the plane of the membrane, of connective tissue corpuscles, whose action was, during their embryonic stage, purely clastic; but later in their permanent development into a fixed membrane, they assumed the plastic function characteristic of the mature connective tissue cell. How perfectly such constructive action may be performed will depend upon nutrition and absence of infection. It is but fair to say that egg membrane may prove, under restricted conditions, a useful substitute for denuded sheaths of tendons, and it is certainly worthy of a more extended trial.

A CASE OF EXTRA UTERINE PREGNANCY—DIAGNOSIS AT END OF SECOND MONTH—OPERATION—RECOVERY.

BY O. J. PFEIFFER, M. D., DENVER, COLO.

The patient is 27 years old; married five years; no children or miscarriages.

The first visit to the patient was made April 3, at which time a history of intermittent pain and flowing since February 8 was given. The pains were severe while they lasted, and were followed by periods of ease for several days. The flowing was irregular in volume, being most copious at the expected menstrual periods, but ceasing altogether at no time. There was and had been no fever or chill at any time during the illness. A bi-manual examination revealed apparently a retroverted, probably pregnant uterus with a knot on its anterior surface. This was made out through an abdominal wall somewhat rigid to pressure from involuntary resistance. The case ran along unsatisfactorily until Sunday, April 7, when an examination was made under ether, which revealed what I took to be a two or three months pregnant retroverted uterus with a fibroid tumor on the anterior wall. Taking several days in which to think the case over, the question arose whether the hemorrhage was caused by the fibroid or by a uterus trying to abort. I decided that a uterus flowing constantly for two months would have resulted in an abortion, and I was afraid the patient was rather too young to have a fibroid; and there was no odor to the discharge, suggesting a dead fœtus. On these three grounds it began to look as if my "fibroid" might be the uterus, and the mass I had supposed to be the fundus of a retroverted pregnant uterus was something else. If my "fibroid" was the uterus it was a non-pregnant uterus, and why should it keep on flowing for two months? If my "fibroid" was the uterus, the mass which seemed to be the fundus of a pregnant retroverted uterus could not be the fundus of pregnant uterus. What could this mass be? What

could keep a uterus flowing constantly for two months and produce a mass behind the uterus which for two months had caused a feeling of something giving way again and again, each time followed by severe pain, and that in turn followed by a relief from pain for a few days?

I began to suspect an extra uterine pregnancy, which, with its constant enlargement, would cause the pain, and explain the flowing of a uterus enlarging with a pregnancy and trying to furnish blood supply to a fœtus which was not within its cavity.

On Sunday, April 14, it occurred to me to make a rectal examination without ether, which had not been made when the patient was under ether, so sure did it seem that the patient had a retroverted pregnant uterus with a fibroid. On making my visit Sunday the patient described another decided feeling of something giving way the day previous, with agonizing pain, after which she felt relieved of pain again.

The rectal examination revealed a round, elastic mass about the size of a small orange just above and behind the cervix. It was soft, compressible and painful to the patient on pressure.

The case had haunted me for ten days, and I began to feel certain that my fibroid was the uterus, and the mass behind it was an extra uterine uregnancy, which had caused the giving way feeling again and again with agonizing pain for two months, and which explained the flowing from an empty uterus.

On Sunday, after the rectal examination, I stated to the husband my diagnosis; told him the pregnancy might rupture at any minute; requested him to take his wife to the hospital at once and be prepared for an operation at any minute in case of a rupture, and if rupture did not occur I would operate Tuesday. Sunday night the patient was at the hospital, my instruments were all ready for immediate operation.

Sunday night salts were given; bowels were moved thoroughly Monday morning, soapsuds enema was given Monday night, and another Tuesday morning. Abdomen prepared for operation Monday afternoon.

Tuesday afternoon, operation. Incision in median line five inches. Patient placed in Trendelenberg position. Omen-

tum and bowels packed upward with sponges. Uterus appeared having blueish purple look of pregnancy. Hand behind uterus discovered sac of a tumor size of large orange (at this time the sac was filled with circulating blood and distended). An easy dissection with the fingers freed sac from adhesions to bowels and elsewhere, and the sac was brought up into wound. It proved to be at the fimbriated end of the left tube. A pedicle was easily made, and clamped and tied off, the ovary being taken along. Bleeding from adhesions was sponged out of abdominal cavity, and the bowels and omentum were returned to place on lowering from Trendelenberg position. Abdominal incision sewed up. Patient sent to her room.

With great interest I divided my tumor and found in its center a perfect little fœtus one-half inch long with embryonic arms, legs, and head the size of a small pea, but showing the blue color of the eyes and the wide slit of the mouth. The small size of the two months fœtus I explain by the fact that the fimbriated end of the tube was a poor source of nourishment at first, and thus precluded growth to the normal size at two months. The sac is a remarkably symmetrical ovoid sphere; its walls are about one-half inch thick. It is two inches long, one and one-half inches wide; the cavity in which the fœtus lay is one inch long and three-fourths of an inch wide. The placental attachment is very plainly shown.

The patient had great shock Tuesday night and vomited for four days, but rectal feeding and hypodermic stimulation pulled her through, and she is to-day, six weeks after the operation, perfectly well.

The specimen is here shown the society very well preserved in ¾ of 1 per cent. formaldehyde solution.

Symposium on Diseases of the Kidney.

PHYSIOLOGY OF THE KIDNEYS.

C. B. VAN ZANT, M. D., DENVER, COLO.

The physiological importance of the kidneys is foreshadowed by three facts: First, their dual arrangement; secondly, their protected position; and thirdly, their disproportionately large blood supply. The functions of the kidneys are most clearly brought out by noting the effects of their removal.

Extirpation of one kidney ordinarily is not followed by any untoward result, when the other organ is normal. The remaining kidney enlarges, becomes more vascular and active, and vicariously assumes the work of its excised fellow, in addition to its own. There is no actual development of new secreting structure in the remaining kidney under these circumstances. Moreover, as a rule, no increase of excrementitious matter occurs in the blood. In some animals, a marked change takes place in their disposition and appetites.

Extirpation of both kidneys in dogs is uniformly fatal in from one to three days; in human beings, sometimes after a longer period. The fatal result is due to uræmia, from the gradual accumulation of waste urinary substances in the blood. It is preceded by an attempted elimination on the part of the stomach, bowels, skin and lungs, of urea, changed into ammonium carbonate. The clinical features are vomiting, diarrhœa, delirium, convulsions and coma, preceding death. If, in a dog, one kidney be removed, and at a later period half or two-thirds of the other, according to Bradford, we have a quite surprising result. After the second operation, the animal rapidly wastes, and dies in a few weeks; but during this period we have a marked increase

in the amount of urine and in the daily output of urea. The exact explanation of this latter fact is still to be found, but it is possible that the kidneys, like the liver, pancreas and ductless glands, form an "internal secretion" which they add to the blood current and that the absence of this substance leads to these marked disturbances of tissue metabolism, resulting in increased production of urea.

From these facts the functions of the kidneys might be formulated as follows:

First, and foremost, to separate the urinary constituents from the blood, in which they pre-exist, and to which, as sewage, they are being constantly added.

Secondly, to influence nitrogenous metabolism of the tissues, possibly by an internal secretion.

The cortex is the part which contains the essential secreting structures of the kidney, the glomeruli and the convoluted tubules; the pyramids, consisting essentially of a collection of discharging tubes. In the histology of the kidney, the most striking peculiarity is its double capillary system or "portal" system. One set of capillaries forms the glomerulus; the other, derived from the first, surrounds the convoluted tubules. Each set seems set apart for a special purpose.

First, as to the *glomerulus.* Here the capillary blood vessels form a tuft, projecting into the capsule of Bowman. The efferent venules have a smaller caliber than the capillary vessels forming the glomerulus, and hence there is a high pressure in the latter vessels. For this reason certain constituents of the blood, especially water and the inorganic salts, pass through the thin walls of the blood vessels into the surrounding capsule of Bowman, which is the commencement of each uriniferous tubule.

Secondly, as to the *convoluted tubules.* By the lining epithelium (rodded cells) of these, the urea, urates and other organic ingredients of the urine are abstracted from the blood of the second capillary network, and added to the stream coming down from the glomeruli.

These two features, *glomerular separation* of the water and inorganic salts, and the *tubular extraction* of the organic

substances, constitute the theory of Bowman as to urine formation, first advanced in 1842 and still generally held, for reasons which time prevents us from presenting.

Much controversy has waged about the mechanism of the secretion of the urine, some contending for the mechanical or *filtration* theory; others, for the *vital* theory. Were the urine simply filtered out of the blood by the kidney, we would expect it to contain all of the ingredients of the plasma, including the serum albumen, the globulins, sugar, etc. But this is not the case. The *urea* which exists in the proportion of four parts in 10,000 in the blood, is taken and the sugar which is present in five times this quantity, is left untouched. Yet both are equally diffusible. Egg albumen injected into the blood, passes into the renal circulation side by side with the serum albumen of the blood. Both are indiffusible through animal membranes and almost identical chemically. But the kidney does not hesitate for a moment. The egg albumen is promptly excreted as a foreign substance; the serum albumen passes on untouched. From these considerations, it is apparent that the kidney is not a simple *filter,* but an organ which exercises a *selective action* on the blood reaching it, abstracting the injurious and refusing the nutritive elements of the circulation. Hence it is that the old filtration theory has given way to the more modern one of vital selection. Not only does the kidney take note of the *quality* of the blood ingredients, but of their *quantity* as well.

So long as there is less sugar in the plasma than three to four parts per thousand, it is refused passage by the kidney, but when this limit is passed the kidneys begin to excrete sugar and continue to do so till the balance is restored. So with other substances, as the NaCl, during pneumonia.

Though its *discharge* from the body is intermittent, the *formation* of the urine is constant. One peculiarity has been noted in animals, and in some cases, at least, in man, namely, that the kidneys act alternately, one secreting most of the urine for fifteen to thirty minutes, and then the other.

The rate of secretion of the urine rises and falls with the pressure, and probably still more with the velocity of the blood in the renal vessels. The separation of the urea by the convo-

luted tubules is, however, less affected by blood pressure than the abstraction of the water and inorganic salts by the glomeruli. A markedly increased blood pressure in the renal vessels may so injure the secreting cells of the kidney as to lead to the escape of albumen.

Of the influences affecting the composition or the quantity of the urine secreted, we have the following: Sex, age, temperature, climate, season, muscular exercise, mental exertion and emotions, amount of water ingested, kind and amount of food, activity of the skin, disease, etc.

The innervation of the kidney is from the renal plexus (formed by branches from the solar, semilunar and aortic plexuses and from the splanchnic nerves). Section of the nerve supply causes enlargement of the kidney and polyuria; stimulation, contraction of the organ and diminution of the urine. These results are accounted for by the fact that the renal plexus mainly carries vaso-constrictor fibers, though, to a slight extent, dilators as well. No special urinary secretion center has as yet been discovered, but that some local center must exist is indicated by the response of the excised kidney, in size and activity, to certain perfused drugs.

Important as is this subject, the limited time at our disposal in this symposium prevents any consideration of the other numerous phases of the physiology of the kidneys.

THE OPHTHALMOSCOPIC EXAMINATION FOR KIDNEY DISEASE.

BY EDWARD JACKSON, A. M., M. D., DENVER, COLO.

In cases of renal disease, the ophthalmoscopic examination follows closely in importance the clinical and microscopical examinations of the urine. Noticeable retinal and vascular changes may be found in the majority of cases; and typical albuminuric retinitis occurs in not less than 10 per cent. Its ophthalmoscopic appearances are easily recognized, are as pathognomonic of the

general disease as any set of symptoms known in medicine, and they have the most definite prognostic significance. Belt, in 419 cases of patients showing albuminuric retinitis, found 72 per cent. were dead at the end of the first year, and 90 per cent. at the end of the second year. A symptom of such frequency and such significance is worth looking for. It should be looked for repeatedly; for some of the characteristic changes are transient. To look for it thoroughly requires the use of a mydriatic. The patient usually presents a small senile pupil. The most characteristic changes are apt to be in or near the macula, a region hard to examine thoroughly without the use of a mydriatic, even in young eyes. If the patient be confined to bed, the difficulty of examination is still further increased, and therefore the need for the mydriatic. But these patients are suffering a progressive loss of vision. If you put atropine in the eye, it takes two weeks to get over it. The atropine impairs the sight, and by two weeks the eye cannot again get as good sight as it had before. The patient suffering from albuminuric retinitis will therefore naturally blame the atropine for his permanent loss of vision. A briefer mydriatic must be used. A solution of cocain, 4 per cent., or euphthalmin, 5 per cent., or homatropine, 1-5 of 1 per cent., should be instilled 40 or 50 minutes before the examination is to be commenced.

What to Look For.—The most constant ophthalmoscopic symptom is alteration of the retinal veins. These are dilated and tortuous, especially some portions of the small veins which arise about the macula. Other parts of the veins may be hidden in swollen hazy retina, so that the dilated portion may look unlike a vessel, but rather like a hemorrhage. Next, hemorrhage may be found anywhere in the retina; it may even extend into the vitreous. The dark red spots that indicate hemorrhages may be large or small, many or few, or, for a time, absent. Swelling and opacity of the retina are usually confined to isolated patches, or to the region surrounding the optic nerve. The color of the patch may vary from a dirty red to snow white, or a gray blue. The swelling is to be measured by the refraction of its summit. Sometimes it looks like a small detachment of the retina; but actual detachment may also occur. White spots arise from fatty

degeneration. These are regarded as most characteristic when arranged in rows, radiating from the center of the macula. Large ones are confined to this region, or to the neighborhood of the disk. But small ones may be scattered in all parts of the fundus. White streaks are occasionally seen along the arteries or wholly replacing them. The optic nerve is often reddened and opaque. It may be swollen until it exactly resembles the choked disk of brain disease.

PERSISTENT OR CYCLIC ALBUMINURIA WITHOUT CLINICAL SYMPTOMS.

G. E. TYLER, M. D., DENVER, COLO.

That albuminuria of renal origin sometimes exists, though no clinical symptoms whatever are discoverable upon the most searching examination and without the presence of casts or other evidence of disease of the kidney, is well established. As a result a separate class has become necessary.

To this form of albuminuria various names have been given, as cyclic albuminuria, intermittent albuminuria, postural albuminuria, functional albuminuria, physiologic albuminuria, albuminuria of adolescence, albuminuria in the apparently healthy, etc.

The characteristics of the conditon are that albumin, usually in small quantities, may be found in the urine for months or years without other evidence of deranged physical condition. It is rare that casts are found, and when present they are scarce and of the hyaline variety. In quite a proportion of cases calcium oxalate crystals are present.

The subjects are most frequently young persons just past puberty, though no age is exempt. Those of neurotic temperament and with poor digestive systems seem especialy liable to attack. Heredity has some influence, the disease having been found in three generations of the same family. A gouty family history is of sufficient frequency to indicate some influence. In

certain persons a cold bath will cause a trace of albumin to appear in the urine. In others severe mental strain, excessive emotion or violent physical exercise produces the same effect. There are persons who are the subjects of albuminuria after the ingestion of several raw eggs.

Those cases which really merit the name of cyclic albuminuria have as a distinguishing feature the fact that albumin is present during a part of each twenty-four hours and absent the remainder of the time. Ordinarily the morning urine is free, but within two or three hours after rising albumin appears and increases in amount until the middle of the afternoon, when it begins to decline, that passed about bedtime being free or showing but a trace. The albumin in this condition is not only serum albumin but also alkali albumin.

Various theories have been advanced to explain the condition. The congestive theory is that some influence, as a cold bath, by driving the blood from the surface, causes a hyperemia of the renal circulation which permits the leakage of albumin. The degenerative theory is that the epithelium of an occasional glomerulus or convoluted tubule has undergone degeneration, thus permitting a slight leakage with the minimum of provocation. Its adherents deny the possibility of albuminuria without structural changes. The hematogenous theory rests upon the hypothesis of a deficient amount of oxygen in the blood, this anoxemia releasing the albumin and permitting it to pass through normal epithelium. The dietetic theory asserts faulty metabolism of proteids, due to some obscure hepatic disorder. Some also advance the idea of a condition analogous to dietetic glycosuria. The neurotic theory is that there is lessened vaso-motor control of the renal circulation, and its advocates point to the fact that a large percentage of subjects are of an age when the nervous organization is unstable, and to the further fact that heredity appears to have some influence. The irritative theory is that by reason of mal-assimilation certain irritants are excreted by the kidneys, the albumin passing through by reason of their excretion. The advocates of this theory point to the frequency of calcium oxalate crystals and to the gouty family history. The postural theory is that the essential factor is the upright position.

It is pointed out that so long as the subject is recumbent no albumin can be found. He may have a hearty meal, he may swing about his arms and legs, he may be massaged, he may study intently, he may even have a cold bath, but so long as he remains recumbent no albumin appears, though within a comparatively short time after he assumes the upright position albumin is found. That the absence of albumin is not due to the warmth of the bed is shown by the fact that the subject may lie uncovered in a cold room and the urine remain free. Most of the cases of albuminuria in the apparently healthy belong to this class. There are, however, some cases in which the albuminuria is intermittent, but not cyclic, the apparent causes being cold bathing, eating of a heavy meal, violent exercise, severe mental effort or emotional disturbance. But for the most part the upright posture appears to be the essential factor. How this brings about the condition is purely conjectural. The sudden filling of the renal capillaries from lowered vaso-motor control is the most plausible explanation.

The diagnosis of the conditon is important. Its very rarity increases the liability that it be overlooked. In order to reach a diagnosis the following things are necessary:

1st. The demonstration of a persistent intermittent albuminuria unaccompanied by casts or other evidence of renal disease.

2nd. The elimination of diseases of other organs, especially of a left ventricular hypertrophy.

In order to reach this diagnosis the separate urine of each micturition for the entire twenty-four hours must be examined and this examination must be repeated several times. Extreme care must also be taken by means of centrifugation to prevent overlooking casts, and there must be the most painstaking, systematic examination of the heart and other organs. If the urine is never entirely free from albumin there is structural disease.

The condition is probably harmless, though some assert that is always means ultimate organic change.

No medicines have any effect on the condition. In a few cases the limiting of proteids causes the temporary disappearance

of albumin, but it reappears when the proteids are resumed. The condition may be present for years and disappear without obvious cause.

A well regulated life, free from all excesses, is the best treatment. The patient should be advised of the exact condition and of its harmless character in order that he may not be disturbed by its accidental discovery.

THE REMOTE PHENOMENA WHICH WOULD PROMPT US TO LOOK FOR DISEASE OF THE KIDNEY.

BY J. TRACY MELVIN, M. D., SAGUACHE, COLO.

As there is no organ of the body which so frequently sets up symptoms in remote and apparently unrelated parts as does the kidney when diseased, we seldom conclude the examination of any patient who is suffering from any trouble whose nature is not clearly evident, without first interrogating the kidneys. Therefore I might claim nearly the whole domain of symptomatology as my field and spend my entire allotted five minutes in rehearsing the endless list of names, which would not be profitable.

Some of these distant symptoms, however, are so constant and so characteristic of kidney lesions that our suspicions are at once aroused and the most inexperienced practitioner cannot fail to connect them.

Persistent headaches, high arterial pressure, sudden amaurosis, and œdema of the face are among these, and their mere mention suffices.

A much larger group, however, are those symptoms which appear only in a small per cent. of cases, and which when present are not always due to the kidneys, yet are frequent enough to demand special recognition at the hands of the general practitioner as suggesting possible renal involvement. There are three or four symptoms belonging to this class to which I would

especially call your attention. Although perfectly familiar to men of wide experience and alluded to by most of our authors, yet I am convinced that their significance is often overlooked by those of us who have less experience in this line.

The first of these is a form of squamous eczema appearing upon the palmar surfaces of the hands and feet. This symptom, sometimes limited in extent yet often quite extensive but always obstinate, at once arouses my suspicions of interstitial nephritis, although I have seen it in two cases of diabetes. I think it occurs in fully half of all my cases of chronic nephritis. It often appears as merely an excessive thickening of the skin with many cracks and fissures.

A second suggestive symptom, and one so common as to almost come under my first class, and yet one which I have known old consultants to overlook in this relation, is repeated and severe vomiting without other cause being apparent. There are probably few of us who have not first detected kidney trouble from this symptom, yet we are not always impressed with its significance, and sometimes permit weeks to pass by while we are merely trying to quiet a supposed rebellious stomach. Indeed, I think that it is not rare to find a chronic nephritis running its entire course without any other marked subjective symptom. It is also, of course, a recognized symptom of diabetes. Another symptom not so very remote, is a severe burning pain in the urethra, usually near the meatus. This pain usually, of course, is only indicative of stone in the bladder or ureters, but in my limited experience it seems to be very frequently a symptom of pyelitis or a tuberculous kidney. It has been a marked symptom in four of my cases where autopsy demonstrated a perfectly normal bladder and no gravel. It is not always associated with frequent micturation, and is sometimes the only symptom of which the patient complains. I well remember the first patient I had who complained of this symptom and the treatment which he received for several troubles which he didn't have, until the post-mortem showed the almost entire destruction of both kidneys from tubercular pyelitis. I have also seen the same symptom less marked in a case of diabetes and in two cases of chronic nephritis. This reflex pain is often very acute and relieved with

great difficulty and has occurred in two-thirds of those cases of tuberculous kidney seen by me.

A fourth suspicious symptom with which we are all familiar and yet which is very frequently slighted by us, especially in this high altitude where it is so commonly due to other causes, is that of dyspnœa, or rather simple breathlessness. We of course expect this in advanced cases of kidney lesion where cardiac compensation fails. It is then marked and clearly recognized, but I refer to an earlier and more transient breathlessness similar to that often met with in a moderately dilated heart of youth, yet not apparently depending upon any condition of the heart itself. The patient sometimes comes to us complaining of this one symptom coming on while at rest or on very slight exertion. Often the attacks will come on at night or on waking in the morning.

When no other evident cause can be found I usually feel sure of finding the kidneys at fault. Sometimes slight amounts of albumen may be found, sometimes merely transient renal insufficiency, relieved at once by proper treatment, yet not infrequently is it an early symptom of chronic nephritis.

I would not extend this list further, as I recognize the ever present danger which we whose experience is necessarily limited in any one class of cases have always to guard against, that of mistaking an occasional coincidence in the history of a case for a definite symptom of the disease itself.

ETIOLOGY, SYMPTOMS AND TREATMENT OF ACUTE NEPHRITIS.

BY H. B. WHITNEY, M. D., DENVER, COLO.

The causes of acute inflammation of the kidney are now thought to be largely if not wholly toxic. The tubules and glomeruli are presumed to be directly irritated by either bacteria or their toxic products, usually the latter. The influence of cold is, however, still admitted, and it is still believed that there exists a distinct antagonism between the skin and

kidneys, in the sense that impairment of the one increases the functional demand made upon the other. Hence cold, though probably not of itself sufficient to produce renal inflammation, may often be an important determining factor in the event of saturation of the blood with toxic materials, either from infectious disease, alcoholic excess or extreme physical exhaustion.

In the brief space allotted to me I can hardly do more than enumerate the usual sources of toxæmia which may result in acute nephritis. Scarlet fever alone is responsible for more than half of all cases. With diphtheria it is a common complication, while it is but rarely met with in measles, varicella, variola, erysipelas, septicæmia, malaria, influenza, pneumonia, acute inflammatory rheumatism with endocarditis, and typhoid, in which it may develop during convalescence, or, in a rather violent form, usher in the disease, so that a renal form of typhoid has often been described. Tonsilitis should be especially mentioned as a probably more frequent mode of invasion than is commonly supposed. Again, nephritis may occasionally follow affections of the skin, such as severe burns and psoriasis. The disturbance of the renal function which occurs so often in connection with pregnancy is probably not inflammatory in character.

Certain drugs may produce acute inflammation of the kidney. The more common examples of this class are terpentine and canthrides used internally or externally, chlorate of potash, bichloride of mercury and carbolic acid. Very rare causes are the mineral acids.

Because it is so often secondary to one of the exanthemata, acute nephritis is largely a disease of early childhood.

The chief *symptoms* of acute nephritis are a high degree of anæmia, the various manifestations of uræmia, dropsy, and changes in the condition and secretion of the urine. Fever, with its attendant disturbances of sleep, appetite, etc., unless dependent upon the primary disease, is usually slight or wholly lacking; any considerable rise in temperature in an apparently primary case should always suggest some complicating infection. Pain, too, in the loins has little or no significance in the symptomatology of nephritis; it is usually wanting and very rarely severe or characteristic.

The onset and development of acute nephritis vary exceedingly in different cases. Oftenest, perhaps, attention is first attracted by a very considerable pallor, with which there is soon associated an increasing œdema, first of the face and later of the lower extremities. The urine is then found to be diminished in quantity, often smoky or even reddish in color, of high specific gravity, highly albuminous, and containing large numbers of red blood cells and granular, epithelial and blood casts. Very many cases, possibly the majority, are much milder even than this; and except for the presence of blood, albumen, or casts in the urine no thought of nephritis would be entertained. Such cases are to be regarded just as seriously as when dropsy or other more alarming symptoms are present. Again, the disease may begin by a more or less complete suppression of urine, which has been known to persist, with eventual recovery, for over three weeks; or urination may be simply frequent, scanty and painful. In still other cases it is one of the various forms of uræmia which ushers in the disease even though the functions of the kidney seem to have been hitherto properly performed. Eclampsia may be the very first indication of renal disturbance. Oftener, persistent vomiting, or severe headache, or amaurosis, or muscular twitchings, or marked stupor are the more immediate percursors of convulsions. And so not only with the onset but also throughout the course of acute nephritis. In the one case the prominent symptom and dominating feature throughout is dropsy, which may invade even the serous cavities and the glottis. In another case it is anuria; and in still others the varying picture of uræmia. In all cases any one of these symptoms may appear at any time, though there are marked differences dependent upon etiology—dropsy and uræmia being, for example, extremely frequent in those forms of nephritis which follow exposure and scarlet fever, and rare after diphtheria. In every case serious danger constantly threatens from convulsions—which may, however, continue for days with eventual recovery—from œdema of the lungs or glottis, or from inflammatory complications, especially of the serous cavities. The course is indefinite, rarely less than four to eight weeks, often six months to a year. Convalescence is indicated chiefly by polyuria, low

specific gravity and the disappearance of casts, though red corpuscles and a small amount of albumen may persist for several months. In rare instances the affection may become chronic.

With the *treatment* I must deal even more briefly. In most cases the leading indication should be rest for the kidney. The natural tendency of the disease is to recovery; and that physician will best manage a case of acute nephritis who earliest discovers its presence and puts his patients under such conditions as best conduce to functional rest for the diseased organ. Without entering into theory or details, such conditions are, in brief, the following: 1. Absolute confinement in bed, a measure of the utmost importance and often to be rigidly adhered to for at least several weeks. 2. An absolute milk diet, to which the lighter farinaceous foods are to be added only when convalescence is well begun. 3. Strict attention to the stomach and bowels, with a view to stimulation of their vicarious function, to be secured by mild saline catharsis and a daily bath at body temperature. 4. Such tonic treatment as may from time to time be demanded.

In this regimen but little emphasis is put upon drugs. Indeed, it would seem to be almost necessary to protest against the indiscriminate use of such drugs as digitalis and the various diuretics in this disease. In the average acute case—even with considerable dropsy—nothing could be more irrational than to urge the inflamed and embarrassed kidney to increased work.

For the severer cases, particularly those in which uræmia is seriously threatened, a vigorous symptomatic and eliminative therapy is required. For great local pain or anuria I would use dry cups followed by poultices. The bowels must be opened freely by saline catharsis, or, in dangerous cases, by compound jalap powder, elaterium, or even croton oil in the event of coma. Large colonic injections of hot salt solution are especially valuable, I believe, to stimulate the renal secretion in cases of anuria; for here, as in convulsions, all theoretical considerations must be sacrificed to immediate necessity. Most important of all is the production of diaphoresis by the external use of heat. Hot air is perhaps most efficient; hot water, either as a bath of twenty minutes, followed by dry blankets, or as the hot moist pack—

the most convenient. Either may be repeated at least twice a day, the hot pack oftener, and, indeed, almost constantly in frequently recurring convulsions. Tincture of veratrium viride, five drops every two or three hours to an adult until the pulse is markedly reduced, or nitro-glycerine in doses sufficient to diminish perceptibly the high vascular tension, are both of very considerable service. In desperate cases diaphoresis should be hastened by the cautious use hypodermically of pilocarpine. Finally, if the patient be fairly robust, uræmia is to be met by the abstraction from the arm of a generous quantity of blood. This is now regarded, Holt affirms, as a justifiable and almost routine measure in the uræmia of acute Bright's by the best New York physicians, referring especially to children. My own experience has been confined to two cases, in neither of which the measure seemed to be of any immediate benefit, although one eventually recovered. I consider it rational and shall persevere in its use.

In excessive dropsy without uræmia, a limited measure of diaphoresis and hydragogue catharsis must also be employed. But warning should be given against the too rigorous application of these remedies when the œdema is not especially threatening; it should never be forgotten that in most cases it tends to disappear of itself, especially under the influence of rest. During convalescence, or at any time when danger threatens from either dropsy or uræmia, it may be permissible to stimulate the renal function by diuretics.

RENAL FUNCTION AND LIFE INSURANCE.

BY C. G. HICKEY, M. D., DENVER, COLO.

Life insurance interests have developed in the past thirty years to such magnitude that a physician can no longer afford to look lightly upon examinations for insurance.

"In the United States, on January 1, 1899, the level premium companies reported business representing a total insurance in force of $6,825,037,770; and the assessment companies and fra-

ternal orders, an amount stated as $7,779,428,000. In short, nearly 15,000,000 policies were then in force, and $14,624,465,770 is the stupendous total. Nearly every dollar of this great liability represents the opinion of members of the medical profession." (Examination for Life Insurance, Greene, page 34.)

It has been estimated that about one-sixth of all applications for life insurance at standard rates are refused, all causes being taken into consideration, and that at least one-fourth of these rejections are based upon the presence of albumin in the urine. (Mark A. Brown in Journal of the American Medical Association, June 18, 1898.)

One twenty-fourth of the total number of applicants! Plainly they are not all sufferers from irreparable damage of the kidneys, although reports from the Equitable Life Assurance Society, reviewing their rejections for albuminuria from 1877 to 1890, show that in 1891 40 per cent. of the number had already died from various causes.

On the other hand, a proportion of death losses of 10 to 12 per cent. from kidney diseases, as estimated by some life insurance statisticians, show that in many cases not enough care is exercised in urinary examinations. One conservative old line company, in its report for 1900, shows 8 per cent. of its death losses from kidney diseases as against about 10 per cent. from tuberculosis. This, too, is not a company which does any substandard business.

In securing a sample of urine for examination it is well to be sure that it was passed by the applicant. Cases of substitution come to light not infrequently. Greene cites one which recently came to his notice in which an obliging friend loaned a sample of his normal urine to an applicant whose own urine by later examination was found to be highly albuminous.

At present most companies require chemical examination of urine in all cases. In a list of twenty-four companies I find but one which requires more than a single chemical examination except there be two examiners, and that only when the amount asked for is $30,000 or more. Microscopic examination is in most cases not expected except when specially requested by the company, and this only in suspicious cases.

Tests for reaction, specific gravity, sugar and albumin are the only ones commonly required.

A persistent alkalinity would suggest the bladder. Some neurasthenics with copious urinary deposit of oxalate of lime crystals have a urine with persistent alkaline reaction.

A high specific gravity may mean but a temporarily concentrated urine, one which will deposit urates on cooling, it may be, and which heat will render clear. The heavy urine of a chronic parenchymatous nephritis would contain an amount of albumin easily determined, together with casts, epithelial, granular and hyaline. There would probably be found, too, at least a suggestion of œdema at the ankles, even in slight cases. If the high specific gravity be due to the presence of sugar it will be easily shown by either Haines' or Fehling's test. It will not be forgotten, however, that a urine with specific gravity so low as 1.015 may contain sugar if in addition to diabetes there be interstitial kidney changes.

A urine of very low specific gravity, say 1.003 to 1.010, may signify the polyuria of diabetes insipidus, especially if it be in a young male; if it be a young female it will more probably be that of hysteria. If the applicant is nearing middle life a urine of the specific gravity mentioned, 1.003 to 1.010, demands serious consideration.

Which leads at once to the most important part of this entire discussion, viz., the presence of albumin, either with or without casts; the significance of each and the prognosis of these cases from the life insurance standpoint.

The whole question of albuminuria still continues, as it has been, a moot one. That it is not regarded now as formerly as diagnostic of Bright's disease is, however, unquestioned.

"The number and variety of the pathological relations under which albumin may appear in the urine compel us to regard it as dependent not only upon inflammation, grave congestions and other coarse organic changes, but upon slight variations in the mechanical conditions of the circulation in the kidney. Excluding accidental admixtures of blood or pus from the bladder or urethra, albuminuria is met with not only in acute and chronic Bright's disease, but in diseases of the heart, lungs and liver, in

peritonitis, pregnancy, abdominal tumors, in most febrile and inflammatory diseases, in many cases of poisoning, in cancer, tubercle and syphilis, in lardaceous disease, in anæmia, debility, dyspepsia, purpura, scurvy, after paroxysmal hæmoglobinuria, in gout, in delirium tremens, in various diseases of the brain and spinal cord, in epilepsy, in certain skin diseases, as well as in apparently healthy persons after bathing, exercise, etc." (Renal and Urinary Diseases, Saundby, page 11.)

A so-called physiological albuminuria has been observed and studied by Leube, Grainger Stewart, Stirling, Senator and others as occurring in the apparently healthy in from 4.2 to 44 per cent. of those examined. In these exercise and posture seemed to modify the amount of albumin, it being increased by active exercise and also by the erect posture.

To this class also belong the two forms of latent albuminuria described by Moxon, in 1876; the first he calls the albuminuria of adolescençe. It occurs in youth or young men and is nearly always present in some specimen of the urine collected for forty-eight hours. The other form he called remittent albuminuria, renamed cyclical albuminuria by Pavy. In this, urine passed after breakfast usually contains albumin; there is then a remission and the early morning urine contains none.

Saundby (loc. cit.), speaking of this class of cases, says: "I do not care to contend that there is not some departure in these cases from the normal mechanism of the renal circulation; but it is certain that neither this lesion nor the loss of albumin gives rise to any derangement of health which impairs the working capacity of the individual or tends to shorten his life; in other words, there are cases of albuminuria which not only do not require medical treatment, but may be safely accepted by life assurance companies."

Others look upon these albuminurias as being accompanied in all cases by a slight lesion of the uriniferous tubules and therefore pathological in character; easily recovered from, it is true, but resulting at length, if continually repeated, in permanent pathological change.

Clement Dukes, who has devoted much attention to the albuminuria of adolescence, says: "The cases of early albumin-

uria, so common in the young, constitute the early stage of what may eventually become developed into that chronic disorganization of the kidneys called Bright's disease." (British Medical Journal, November 12, 1881, and Lancet, December 12, 1891, as quoted by Robert E. Edes in Journal of American Medical Association, November 5, 1898.)

So excellent a clinician as Osler, in his "Practice of Medicine," says: "The physician is daily consulted as to the relation of albuminuria and life assurance. As his function is to protect the interests of the company, he should reject all cases in which albumin occurs in the urine. It is even doubtful if an exception should be made in young persons with transient albuminuria."

In the matter of casts and their estimated importance, there exists at the present time the same dissonance of opinion. Anyone who has made any considerable use of the centrifuge must have been impressed by the frequency with which a stray hyaline cast or two has been encountered in urine presenting no other evidence of kidney disease.

Haines and Skinner claim that by their careful methods of search casts may be found in the urine of persons in perfect health. (Journal American Medical Association, January 29, 1898.) Other observers make the same claim.

Kobler (Wiener Klinische Wochenschrift, November 14, 1900) has studied this question carefully and concludes that the true significance of hyaline casts is not known; that even granular and epithelial casts are often found when no morbid condition of the kidney exists, but when there is gastro intestinal disease, especially when this is accompanied by violent diarrhœa; in some cases also where a condition of constipation is present.

Others, however, are inclined to regard the presence of even hyaline casts, at least in anything more than the smallest numbers, as of serious import. In this connection I quote Purdy as saying: "Numerous observers have found hyaline casts in non-albuminous urine, but the author agrees distinctly with Bartels in that he has never met with them save in albuminous urine or urine that has recently been albuminous." (Practical Uranalysis and Urinary Diagnosis, Purdy, Fifth Edition.)

By way of summary, then: In view of the divergence of opinion on these points among competent men, I believe a medical examiner is justified in recommending for insurance an applicant *below middle life,* whose urine may have shown albumin or casts, or both, only after continued observation for a length of time, and even then only as a substandard risk.

The present status of the entire matter, with the limitations of our real knowledge of the subject, is well given by Dr. Lambert, medical director of the Equitable Life Assurance Society, in the following words: "I will admit, and I believe that there are cases where albuminuria does not mean any more than a cold in the head, and I will admit that there are many cases where the subjects live on in spite of albuminuria, but I cannot yet discover any means by which I can distinguish between the case where the subject is going to live and the one where he is going to die early. (Quoted by Greene. Examination for Life Insurance, page 340.)

After middle life the rule should be practically absolute *against* recommendation in the class of cases under consideration.

In many cases near or past middle life great reliance must be placed upon the condition of the heart and blood vessels. An apex beat beyond the nipple line, an accentuated aortic second sound, a moderate atheroma with a pulse of increased tension, would, together, be suspiciously suggestive of a contracted kidney, even in the absence of any definite urinary evidences of the disease.

In this condition, with urine of low specific gravity, albumin, never present in more than minute quantity, is often absent for days together. This necessitates delicate tests and repeated examinations. If Heller's test is used, the test tube should be set aside for fifteen minutes, as a trace may not show for that length of time. (Janeway, as quoted in Philadelphia Medical Journal.)

That there is agreement of authorities in regard to the *intermittent presence only* of albumin in many cases of chronic interstitial nephritis makes obvious the inadequacy of the single

examination of urine required by most companies in ordinary cases.

The proportion of from 8 to 12 per cent of death losses from diseases of the kidney, as referred to before, leads me to suggest that in my opinion, in applicants past 40 years of age, life insurance companies would do wisely to require several examinations of urine for albumin, even though there be nothing suspicious in that first presented; that a large saving would be effected, too, in death losses, if in addition the companies were willing to pay an extra fee for the use of the centrifuge and the microscope in the examination of the urine in all cases in which the applicant has passed the 40-year mark.

NEPHRALGIA AND THE NEUROPATHIC KIDNEY.

BY H. T. PERSHING, M. D., DENVER, COLO.

It is the exception, rather than the rule, that disease of the kidneys causes pain. The various forms of nephritis generally pursue a painless course or cause only a vague distress. Even renal calculus may for a long time cause no pain.

When renal disease does cause pain it is felt in the kidney itself, because the kidney is so deeply buried in the trunk as to be inaccessible to the observation of its owner, and hence is not represented in consciousness. The pain actually felt seems to be in adjacent parts of the body, and is called referred or reflex pain.

The typical renal pain is that caused by renal calculus. It is felt mainly in the back, in the region of the twelfth dorsal vertebra, and in a band extending forward and downward from this region to the median line below the umbilicus. This band is often tender to the touch, and there is an especially sore spot over the tip of the twelfth rib. In males there is generally considerable pain referred to the testicle on the same side. The sensory nerves of the kidney, of the superficial area just described and of the testicle, all enter the spinal cord at the level

of the tenth dorsal segment. Disease of the kidney irritates the whole of this segment, and thus modifies the normal sensory impulses from the skin area and the testicle so as to make them painful. When the renal irritation is intense, especially if the ureter is also involved, the referred pain extends downward to the groin and inside of the thigh, areas supplied by the eleventh and twelfth dorsal and first lumbar segments. This extension of the painful area is due to an extension of the irritation of the spinal cord into the corresponding segments.

If all that is characteristic of renal pain depends upon irritation of certain spinal segments, particularly the tenth dorsal, then irritation of this part of the cord in other ways ought to cause the same kind of pain; and this is the fact.. These segments receive sensory impulses from the testicle or ovary, the prostate, and part of the intestine, so pain due to disease of any of these organs may closely simulate renal pain. For some unexplained reason disease of a kidney or of a testicle may cause a referred pain greater on the opposite side. Moreover, these segments may be so irritated as to cause a similar pain by certain organic disease of the cord, e. g., by tabes, giving rise to the nephralgic crisis, which precisely resembles the pain of renal colic.

And even without organic disease of the cord or the organs connected with it, toxic conditions, such as typhoid fever, influenza and uric acid accumulations may so irritate the spinal segments as to cause a similar pain.

But this is not all—this pain, like all others, may be irritated by hysteria. Gilles de la Tourette cites in detail three cases in which nephrotomy was performed on hysterical patients without renal disease.

It is obvious, then, that a diagnosis of disease of the kidney can never be safely made from pain alone—there must be other evidence that the kidney is diseased, or, at least, all the other causes of similar pain must be considered, and as far as possible excluded. But in neurotic patients other signs pointing to the kidney may also be deceptive. I had a male patient some years ago who suffered from hæmoptysis and hæmaturia, both certainly hysterical, and promptly cured by suggestion. Such a patient might easily have had an hysterical nephralgia, and the

combination would have been calculated to deceive even the elect.

The difficulties of diagnosis here indicated are not merely theoretical—they are real, and have caused numerous mistakes.

THE ETIOLOGY AND PATHOLOGIC ANATOMY OF CHRONIC NEPHRITIS AND AMYLOID KIDNEY.

BY J. A. WILDER, M. D., DENVER, COLO.

On account of the confusion that has resulted from the variety of classifications advanced by different authors on the subject of chronic nephritis, I have thought best to make the simplest classification possible, i. e., chronic parenchymatous nephritis and chronic interstitial nephritis, with the understanding that although for pathological study it is advisable to consider the kidney as divided into two separate and distinct parts; yet when we consider the physiology and histology of this organ we find the two parts inseparably combined. The parenchyma of the kidney may be considered a mucous membrane extending from and continuous with the mucous membrane of the ureter, and which lines the pelvis of the kidney and the uriniferous tubules in their tortuous courses through the medulla and the cortex of the organ where it terminates as a lining to the Malpighian bodies and capillaries entering them.

The interstitial part of the organ consists of the connective tissue between the uriniferous tubules and glomeruli, and which serves to bind them together, give support to the blood vessels, nerves and lymphatics and gives consistency to the kidney. That a chronic inflammation of the parenchyma cannot exist, on account of this intimate association of the two parts, without involvement of the interstitial tissue, and that a chronic inflammation of the interstitial tissue cannot exist without involvement of the parenchyma must be laid down as postulates. All types of chronic Bright's disease are, therefore, examples of diffuse nephritis; but as in some cases the parenchyma is primarily and chiefly involved, and in others the interstitial tissue

is first and most extensively affected, we are justified for pathological purposes in making the distinction of chronic parenchymatous and chronic interstitial disease.

The great majority of cases of nephritis, both acute and chronic, are caused by irritants carried to the kidney by means of the circulation. These irritants may differ considerably in nature, prominent among them being bacterial toxines and alcohol. It is quite probable that others have their source within the body as a result of faulty metabolism. When the irritants are carried to the kidney in large quantity within a short period of time, or when the organ is especially susceptible to the irritant, as in some of the acute infectious diseases, an acute nephritis usually results. When the irritants are carried to the kidney in relatively small amounts, but extending over a greater length of time, a chronic nephritis results. In other words, the chronicity of the disease depends largely on the degree of irritation to which the kidney is subjected and the length of time that the irritation is continued. As examples, may be mentioned the acute nephritis following scarlet fever and the chronic nephritis following the prolonged use of alcohol. That the susceptibility of this organ to the action of irritants varies in different individuals it seems to me quite as reasonable to assume as that this difference exists with other viscera, and if this assumption be allowed, we can go further and assume that in some cases the mucous membrane constituting the parenchyma of the kidney is quite susceptible to the action of irritants, while in others it has a considerable degree of resistance to them. The same statements might also apply, although to a lesser degree, to the interstitial tissue. By this means we might explain why in different cases the same etiological factors, for instance, the long continued use of alcohol, will in some produce the chronic parenchymatous type, in others the chronic interstitial type of the disease.

Chronic parenchymatous nephritis is usually a disease of young adult life, and is often secondary to acute parenchymatous nephritis. In a certain percentage of these cases it is possibly the result of improper treatment or lack of treatment of the acute disease. This variety of nephritis is often secondary to some of

the chronic infections, such as tuberculosis, syphilis and chronic malarial infection.

The long continued use of malt liquors and other alcoholics also leads to it. Two varieties of this form of disease are recognized by most pathologists, viz., the large white kidney and the small white kidney. In the former variety the kidney is, as the name indicates, considerably enlarged, being frequently twice the normal size or even larger. The capsule generally contains some congested blood vessels. The organ cuts without difficulty, and on section the capsule retracts and the cortical substance protrudes. The capsule strips easily. The cortex is found to be quite pale in color, sometimes having a fatty appearance, and is greatly increased in amount, being often as thick or even thicker than the medullary portion. The medullary pyramids appear somewhat compressed. They are usually rather pale, but darker than the cortical portion, and in some cases may be quite red. Occasionally small linear extravasations of blood will be seen in the cortex, giving it a mottled appearance, this form of chronic parenchymatous nephritis being frequently known as chronic hemorrhagic nephritis.

On microscopic examination the most prominent changes are found in the tubules, especially the convoluted tubules. The epithelium is found in different stages of disintegration, ranging all the way from cloudy swelling to advanced fatty degeneration. In the less advanced cases the epithelial cells lining the tubules are swollen, granular, their nuclei somewhat indistinct. The cell bodies appear to have coalesced and encroach on the lumen of the tubules, in some cases appearing to have entirely occluded it. When the process is in a more advanced state the cells become entirely broken down, and the tubules contain nothing but masses of fatty and granular material, together with large numbers of hyaline, granular and fatty casts. This degeneration, although usually most marked in the convoluted tubules, may extend through the whole length of the uriniferous tubules, and the glomeruli are in all cases more or less affected by the same changes. The connective tissue between the tubules is seen to be swollen, and in some cases increased in amount, as shown by the newly formed connective tissue cells. The connective

tissue in Bowman's capsules is also usually increased, giving them a thickened appearance.

The small white kidney, which is regarded by many authors as being secondary to the type just described, differs from it in size and in the amount of connective tissue present. The kidney is much smaller, the capsule adherent, the surface granular and the cortical portion thinner than in the large white kidney. The increased connective tissue is found scattered irregularly through the organ, in some cases compressing and constricting the tubules and tufts.

The changes in the epithelium of the tubules and Malpighian bodies are similar to those found in the large white kidney.

Chronic interstitial nephritis is, probably, in the great majority of cases, a primary disease, i. e., not secondary to parenchymatous nephritis, being often part of a general fibrosis in which the liver, pancreas, prostate, heart and arterial walls are involved. Whether or not this type of nephritis is ever the result of a chronic parenchymatous nephritis has been for some years, and is at present, a disputed point among pathologists; but I think that the weight of evidence tends to answer the question in the negative. This condition usually comes on in advanced life, and in some cases appears to be a physiological process of old age. In other cases, as has been already mentioned, the condition depends on a slight or moderate degree of irritation of the kidney continued for a long period of time. The long continued use of alcohol, especially of distilled liquors, is probably one of the most potent etiological factors. The chronic cachexias seem to lead to it. Osler lays special stress on the excessive use of nitrogenous foods, especially when coupled with lack of exercise. Heredity appears to be an important factor in some cases.

The kidneys are usually much smaller than usual, one often showing more advanced changes than the other. The surface of the organ is irregular and often lobulated. The capsule strips with difficulty, on account of the attachments formed between it and the cortex. It is thickened, and directly underneath it small cysts, due to the occlusion of the uriniferous tubules by the contraction of the connective tissue, are often found. The sur-

face of the kidney is granular, and usually red or grayish in color. The organ resists the knife to a marked degree, and on section the chief macroscopic changes are found in the cortex. This part of the kidney is found to be much thinner than normal, the pyramids consequently being very prominent. The relative thickness of the cortex and medulla, instead of being about one to two, as in the normal kidney, is often one to eight, or one to ten, and over some of the medullary pyramids the cortex may be so thin as not to be recognized. On microscopic examination a marked hyperplasia of connective tissue is seen scattered all through the organ, but most marked in the cortex. The new connective tissue may be in all stages of development from the lymphoid cells to the fibers of adult tissue, and is usually greatest in amount between the convoluted tubules, in Bowman's capsules and around the blood vessels. The new tissue is distributed irregularly throughout the organ, in some places being quite dense and in other places the kidney substance appears nearly normal. By its contraction it compresses the tubules, and, as has already been mentioned, may cause occlusion of their lumen and subsequent dilitation above the point of compression. The epithelium of the tubules and tufts is found in different stages of degeneration, being frequently hyaline and granular, sometimes fatty, although these changes are not as prominent a feature as in the chronic parenchymatous form.

Amyloid disease of the kidney is a degeneration that is most frequently associated with chronic parenchymatous nephritis. It cannot be considered a distinct form of nephritis per se. It is generally associated with amyloid degeneration of the liver and spleen, and is probably in the majority of cases caused by absorption of the toxines of the pyogenic organisms. For this reason long continued suppurations, such as chronic tuberculosis with mixed infection, and diseases of the bones, are the most important etiological factors. It is sometimes caused by malaria, syphilis, leukaemia and actinomycosis. The kidney is often considerably enlarged, but may be normal in size. The tissue is firmer than normal and resists cutting to some extent. The capsule usually strips readily. The surface of the kidney is smooth, and on section the cortex is found enlarged, and in well marked

cases has a glistening waxy appearance, forming a marked contrast to the medullary portion, the pyramids being dark red in color.

Microscopic examination shows the translucent, homegenous amyloid material in the walls of the blood vessels, particularly in the vessels of the Malpaghian bodies. Bowman's capsules are thickened and frequently degenerated. The amyloid change, which appears first in the walls of the small blood vessels, appears later in the connective tissue. The epithelial cells lining the tubules do not as a rule undergo amyloid degeneration, but become hyaline, granular and fatty, and the tubules usually contain hyaline casts. The increase of connective tissue and degenerative changes in the tubules depends on the grade of associated chronic nephritis, which is usually present.

To sum up, then, we have, first, under the head of chronic parenchymatous nephritis, the large white kidney and the small white kidney. The former is usually much enlarged, has a smooth surface and a capsule that strips easily, and in which the degenerative changes occur primarily and are confined chiefly to the epithelium of the tubules. When the kidney is of the small white variety we have the same changes in the tubules plus greater involvement of the connective tissues than in the large white kidney.

In the kidney of chronic interstitial nephritis we have an entirely different picture, the organ being contracted, the capsule adherent, and the primary changes being in the interstitial tissue, which shows marked involvement, the changes in the tubules being secondary to and due in part to contraction of new connective tissue, and are never as uniformly distributed throughout the organ as in the former variety.

Amyloid disease of the kidney seldom exists as an independent pathological process, the amyloid degeneration being in the great majority of cases associated with chronic nephritis, usually of the parenchymatous form, the pathological changes in the kidney being due in part to the co-existing nephritis, in part to the amyloid changes. The amyloid changes are usually present simultaneously in the liver and spleen.

DIAGNOSIS AND TREATMENT OF THE CHRONIC NEPHRITIDES.

BY H. R. BULL, M. D., GRAND JUNCTION, COLO.

I cannot presume to add anything new to the diagnosis of chronic nephritides. Nevertheless, we are so constantly meeting these conditions in one form or another that it is profitable to review the ground again.

It seems that some confusion exists in the classification of the chronic nephritides, and for the sake of greater simplicity we shall take up briefly in order the diagnosis of chronic interstitial nephritis, parenchymatous nephritis, tubercular nephritis and amyloid kidney.

In the diagnosis of chronic interstitial nephritis we frequently find an entire absence of the ordinary chain of symptoms which lead us to suspect the integrity of the kidneys, the condition being a chronic inflammation of the kidney with new growth of connective tissue, causing the contracted, indurated kidney. We find in these cases frequently no albumen or casts, or only traces of albumen. There is no dropsy, and the percentage of urates may be normal. Probably after a number of examinations, particularly if we examine the specimen from the first passed in the morning, we will find albumen and occasionally casts with a few cells of renal epithelium. Inconstancy of albumen is, in my experience, constant in these cases. There is rarely noticeable pallor of the skin. At an autopsy on one of these cases, in the case of a patient who died of puerperal eclampsia, it was a surprise to note how much contracted kidneys could have existed with so little change in the character of the urine.

We do find that the subjects of this disease are 45 years old or past in the vast majority of cases, and we find them complaining of headaches where there has usually been no history of headaches before. This headache may be light and transient, or constant and severe, even in some cases running into delirium or coma.

Disorders of vision may be associated with the headaches. I have a patient at the present time who has a constant precursor of these headaches, a temporary partial blindness, which precedes the headache by three or four hours, and as a curious circumstance the degree of blindness is an index to the severity of the headache which follows. The circulation is quite constantly characterized by high arterial tension, the result of hypertrophy of the left side of the heart, and favored also by an arteritis which accompanys and complicates the condition.

I have also found an irregular rythm of the heart a common and annoying symptom. Dyspnœa is the common condition associated with high arterial tension. This is first a shortness of breath upon exertion, such as rapid walking or excitement of any kind; it is later liable to manifest itself in distinct attacks of dyspnoea, which last for a few hours or a day or more. I believe that altitude markedly influences this symptom, as my patients have been invariably benefited by going to a lower altitude, and seem to have especially unpleasant experiences in going over the mountain passes on the railroads. The stomach may or may not continue to perform its function undisturbed; usually, however, the digestive function is impaired, and seems to have some influence in causing the headaches.

In the diagnosis of chronic parenchymatous nephritis probably the most constant diagnostic condition is that the urine regularly contains casts and albumen. The urine is commonly irregular in amount and of low specific gravity; the more chronic the case the less the specific gravity, with many exceptions. In connection with these constant changes in the urine, we notice a peculiar pallor of the skin, and that the skin has a dry, harsh feeling. When we pinch up the skin we notice that it has lost some of its natural elasticity. We find these patients easily exhausted upon making any exertion, and frequently suffering from palpitation and dyspnoea. They are anaemic from the diminution of the red corpuscles and a lessening of the hemoglobin. General anasarca is often associated with the pallor of countenance. It is more marked about the face, particularly the subcutaneous tissue about the eyes in the morning upon arising.

and disappearing as the day goes on to appear as an oedema about the feet and ankles. As the disease progresses the dropsy may become very general. Headaches and insomnia annoy these patients, and may be the precusors of uraemic attacks, with vomiting, stupor or convulsions. Indeed, as the disease progresses toward the last stage, a condition of continued or chronic uraemia is entered upon which is progressive until the end.

In tubercular nephritis we have the urine, containing from time to time pus, blood corpuscles, renal epithelial cells and tubercle bacilli.

I wonder, in this connection, if other men who do work with the microscope find as much difficulty in finding the tubercle bacillus in tubercular pus as I have found. I have frequently failed after repeated trials where there could be no question of the real tubercular focus of the pus formation. Tubercular kidney is more commonly unilateral, and pain and tenderness upon deep palpitation can nearly always be produced. There is commonly a tubercular history, and likely tuberculosis of some other organ or tissue. The diseased kidney is enlarged, and we may have sweats or hectic fever if the disease is at all active.

The waxy, lardaceous or amyloid kidney we find not as a disease of the kidney primarily, but as a condition secondary to such constitutional diseases as syphilis or tuberculosis, or following a chronic dysentery. It is particularly liable to follow the chronic suppurative forms of tubercular disease, or injuries of a character associated with prolonged suppuration. The urine is increased in quantity and contains much albumen, but not many casts as a rule. The casts found are of a semi-transparent, hyaline variety, and are said to give the characteristic amyloid reaction when treated with an aqueous solution of iodin. The liver and spleen are usually enlarged, and there is not the hypertrophy of the left side of the heart. There is a sallow appearance to the face, rarely dropsy, and usually considerable emaciation. The disease progresses slowly and often lasts for years.

In summing up the management of the chronic nephritides we find that there are certain well defined principles which apply generally to all forms of the disease. The first and most important is the selection of a warm, dry climate, preferably at a low

altitude. I believe that it is important in selecting a climate to avoid localities where there is much wind, and it is well to change the climate with the changing seasons. If we send our patients to Southern California or Florida, or some other similar climate for the winter and spring months, we find that they do well. To those who are unable to seek a warm, dry climate (and they constitute the majority of patients), the matter of avoiding exposure to dampness and cold is extremely important. Such patients should remain in doors, except when the weather is pleasant.

In the matter of clothing, woolen or a mixture of silk and wool should be worn next to the skin, as it is of prime importance that the excretory function of the skin should be preserved, to relieve as much as possible the burden on the kidneys. Regular and moderate exercise in the open air is desirable, however, where the strength of the patient and the climatic conditions will permit. The dietetic management requires much tact and judgment; the nearer that we can approach a bread and milk diet the better. Milk is a complete food, besides being one of the best diuretics. Where milk does not agree with the patient, or to avoid intolerance in protracted cases, we may permit the addition of green vegetables, farinaceous foods or ripe fruits. In a few cases fish or light colored meats may be allowed in great moderation, but we must avoid the use of dark meats, game, condiments or spices and alcohol or beer.

When it comes to the matter of treatment, we should always treat the patient rather than the disease. We mean by this that we should always recognize carefully the physiologic and pathologic condition present, and at the same time make a close study of the individual.

In the chronic interstitial nephritis very little is required in the way of drugs during the early stages, except to meet special conditions as they arise. On account of the high arterial tension, we often find the nitrites of decided value by causing dilatation of the arterioles and relieving the arterial tension. Nitro-glycerine in doses of 1/100 to 1/50 gr., pushed until there is decided flushing and fullness of the arterioles, is the most satisfactory of the nitrites. Sodium and potassium nitrite act in a

similar manner, but are not so satisfactory or prompt. When the nitrites are used it is all important to be sure of the reliability of the preparation. From some personal experience I have found the tablets of nitro-glycerine to be unreliable, and I get much more certain results from the 1 per cent solution.

In this class of cases iron seems to do more harm than good, in increasing the headache and general discomfort. Diuretics are seldom indicated in this form of nephritis; however, certain natural lithia waters, used for a long period, have apparently been beneficial, more especially in the rheumatic and gouty cases. In the parenchymatous nephritis, with its accompanying pallor and anæmia, iron is of decided value, particularly Basham's mixture.

With the first appearance of oedema comes the demand for rest in the recumcent position. Digitalis now becomes a valuable diuretic, as well as a heart tonic, and may be combined or alternated with strophanthus or caffeine. Theobromin, or the preparation known as diuretin—sodio salicylate of theobromin—are highly recommended by some authorities, but in my experience have not acted with any degree of certainty. For the insomnia and headache which may appear in any of the nephritides, I am in the habit of giving a full dose of chloral hydrate, 30 to 40 grs., by the rectum, in milk or water. It rarely disappoints me, and is an excellent arterial dilator.

When it comes to the management of coma, stupor or convulsions which may appear in the advanced stages of any of the nephritides, we can only adopt the working theory that an active poison is circulating in the blood which must be eliminated, and we must have recource to blood letting, purging, diaphoresis and diuresis. Bleeding freely, and followed by the subcutaneous injection of a normal salt solution, is a most valuable procedure, comprehensively designated as washing out the blood. For free purgation calomel, by reason of its being readily retained and its certainty of action, stands first in most cases. Elaterin and its congeners are of value for quick action and to deplete the system by free alvine dejections.

To promote free diuresis under these conditions theobromin, or, in the vigorous pilocarpine, may be used with ad-

vantage. Pilocarpine is also the most useful internal remedy for inducing free diaphoresis and is best given hypodermically. Its action may be increased by a hot pack, or better, by the introduction of hot air, under a tent made by elevating the bed clothes. Finally, in all cases of chronic nephritis, it is of the greatest importance that the patient should be educated to a thorough appreciation of his condition, in order that he may apply in his every day life with intelligence the dietetic and hygienic principles so important in prolonging life.

URAEMIA AND ITS DIFFERENTIAL DIAGNOSIS.

BY S. D. HOPKINS, M. D., DENVER, COLO.

In this paper the classification of the symptoms will not be considered as the nervous, gastro-intestinal and the dyspnœic manifestations of the disease are all brought about by the action of the poison in the blood on the central nervous system. As a matter of convenience, we will study the various symptoms which occur in the acute and chronic cases of this disease and later take up the differential diagnosis in full. One of the first manifestations of uraemia is the headache, which may be associated with other nervous phenomena, such as numb and tingling sensations, itching of the skin, dizziness and gastro-intestinal disturbances. These symptoms are always found in the chronic cases, and one or all may precede the drowsiness or usher in an acute attack. The headache is usually dull in character, occipital, extending down the neck.

At the Arapahoe County Hospital I have seen a number of cases in which the headache was unilateral, and the paralytic symptoms which followed corresponded to the side on which the headache occurred, and at the autopsy oedema of the brain was found, on the opposite cerebral hemisphere to that of the motor parlaysis.

These symptoms may appear suddenly or gradually, without any suspicion of disease of the kidneys. Drowsiness is an

early symptom, and may be slight or severe in degree, and if it is intense, it soon passes into coma. The coma, from uraemia, is not as pronounced as that found in cerebral disease. Preceding or during the coma convulsions, varying in degree and not localized to any portion of the body may take place, although in the majority of cases one side is more affected. Gowers states: "Rigidity of limbs or local muscular twitching during the coma is, if constant in seat, in favor of cerebral mischief; if variable in position, it is in favor of uraemia."

Acute mania, delusional insanity (Folie Britique) and melancholia may develop, although the latter is not frequently seen. Dyspnoea of a hissing character, resembling the paroxysmal attacks seen in leukaemia, is a typical symptom of the chronic form.

Bradford says: "More frequently, however, the dyspnoea is only the accompaniment of other uraemia manifestations, and its peculiar hissing quality in a drowsy patient, with bleeding gums, is very characteristic of the uraemia state."

In the acute cases the dyspnœa is paroxysmal, while in the chronic it is hissing and soon becomes cheyne-stokes in character. Monoplegia or hemiplegia may develop after a convulsion, or come on gradually without any apparent cause. Frequently in chronic Bright's disease insomnia is a very troublesome symptom, associated with cramps, twitching and hiccough, without any disturbance of consciousness. Pulse is full, strong and slow early, but as the uraemic state becomes deeper it is increased in frequency.

Pupils are usually equal, although in the majority of the cases seen by the writer the pupils have been contracted, and in one case of interstitial nephritis all the symptoms corresponded to those of opium poisoning—e. g., contracted pupils, slow respiration, slow pulse, loss of reflexes, deep coma, although a slight trace of albumen and a few casts were found in the urine. One must always bear in mind the peculiar physiognomy in these cases, and at times may detect the odor of urine on the breath.

The temperature is either normal or subnormal, and when a rise of temperature is present, it can be accounted for by some inflammatory process in the body. Suppression of urine may be

one of the first symptoms, and is a constant one, and when vomiting accompanies the scanty urine the vomited material sometimes has the urinous odor. In some cases the typical, albuminuric retinitis is present, and the patient may complain of impairment in vision or may be totally blind.

There is a form of uraemia called ,from its very light symptoms, "latent uraemia,' and due to complete obstructive suppression of urine. The symptoms are as follows: Little headache, nausea, pupils contracted, tongue dry, temperature subnormal, weakness and drowsiness and towards the end slight twitching of the muscles. The most trustworthy signs are the contracted pupils, subnormal temperature and no loss of consciousness.

In making a differential diagnosis the various diseases of the nervous system are first to be thought of. Cerebral hemorrhage may be simulated by the uraemic state, but the constant hemiplegia, associated with conjugate deviation of the eyes, along with deep coma and an inequality of the pupils, would suggest hemorrhage.

Unilateral convulsions are always in favor of cerebral mischief. Local muscular twitching or rigidity, if constant, in seat, is an indication of disease of the brain; whereas, if it is variable, it is probably due to uraemia.

The temperature in uraemia is usually normal or subnormal, while in cerebral hemorrhage it is subnormal at first and greater on the paralyzed side; later fever is developed, which is higher on the affected side. In uraemia the fever is the same on both sides, and is usually due to some complication, such as pneumonia or other inflammatory condition.

The face has a characteristic waxy hue in renal disease, whereas, in hemorrhage, it is flushed with the throbbing carotids. If albuminuric reinitis is present, associated with albumen and casts in the urine, without any localizing symptoms, cerebral hemorrhage can be excluded. The same points hold good in cerebral thrombosis and embolism, excepting that in the former we have the prodromal and the local symptoms developed without any disturbance of consciousness, or only slight in degree, and of short duration. Latent uraemia simulates this vas-

cular lesion more than any other form of the disease. We are not justified in making a diagnosis of cerebral embolism unless a definite cause is discovered, such as endocarditis, a suppurative process in some portion of the body, the parturient state, or blood changes often found in chronic syphilis, with exhaustion. Simple apoplexy of the aged has the same symptoms as the vascular lesions, without any pathological changes to be found. In tumor of the brain the history of the case, with distinct localizing symptoms associated with marked choking of the optic disks, would be sufficient to exclude uraemia, for in kidney disease the degenerative changes which take place in the retina are characteristic. Suppuration in some portion of the body, particularly middle ear disease, irregular temperature, slight swelling of optic disks, permanent unilateral symptoms, are the principal ones of abscess of the brain. Meningitis may be a complication of uraemia, or the symptoms in kidney disease may closely resemble the former, but the irregular slow pulse, rigidity of posterior neck muscles, increased temperature, involvement of cranial nerves, irregular respiration, are typical of meningitis. The pulse in meningitis is the same as that found in uraemia, being slow at first and later becoming rapid.

In simple syncope we have no convulsion, ridigity of the muscles, paralysis or any degenerative changes in the retina.

In chloral poisoning the patient is in a deep sleep, without any twitching of the muscles, whereas, in uraemia, as the case progresses the twitching is especially seen in the forearms. The history of the case and absence of any evidence of renal disease would exclude chloral poisoning. The smell of alcohol is frequently detected on the breath in unconscious cases, but should only be given weight when there is an absence of symptoms of constitutional disease and affections of the nervous system. The coma in alcoholism is always noisy in character, and is never preceded by convulsion. The pupils are of little value, for they may be normal, contracted or dilated. In alcoholism paralysis never occurs unless there is a complication, such as peripheral neuritis or a cerebral vascular lesion. The typical symptoms of the second stage of opium poisoning are contracted pupils, slow respiration, four, eight or ten per minute, slow pulse, dilated

capillaries of the face, and with an absence of albumen or casts in the urine would guide one in arriving at a definite conclusion.

Lead poisoning may be mistaken for uraemia, as the attack may be ushered in in the same manner, but the presence of lead in the urine and the blue line on the gums would remove all doubt.

In diabetes mellitus the nervous symptoms and coma may be profound, but the urine, containing a large quantity of sugar, would be ample in making a diagnosis. The uraemic convulsions may be epileptic in character, but the history of previous attacks, with the tonic and clonic stage, flushed face, biting the tongue during convulsion, the short duration of the attack and absence of any symptoms of renal disease would prevent a mistake. It is a difficult task to make a defferential diagnosis between epileptic coma and uraemia when a previous history of the case cannot be obtained. In the latter, however, the increased arterial tesion, albumen and casts in the urine, degenerative changes in the retina and hissing respiration would serve to distinguish it from the former.

A malingerer may feign the symptoms of uraemia, and the two most frequent ones used by these persons are convulsions and coma. Convulsions which are variable in degree, and not localized to any particular portion of the body, are characteristic of renal disease, while the feigned spasm is general with an absence of any other signs of kidney disease. In the coma of malingering, the pulse, respiration and pupils will be normal, along with the absence of all other signs of kidney disease. A persons who is feigning coma can be detected by making severe pressure over the supra-orbital nerves or pricking the patient with a pin, causing a voluntary movement of the limb or an utterance of abusive language. This is not true of coma due to the kidney disease if it is intense.

Hysterical coma is usually seen in females, and is ushered in by delirium or may come on suddenly. The temperature may be raised, if severe muscular exzertion has been made, otherwise it is normal, along with normal pulse and retention of urine, with absence of all other indications of renal disease.

In cerebral anaemia, which is produced by sudden loss of blood, headache is rare, although in anaemia, caused by blood states, headache is general and neuralgic in character, associated with drowsiness, vertigo and mental dullness. These symptoms are present in uraemia, but are not relieved when the recumbent posture is assumed, as they are in anaemia of the brain. The history of the case, absence of degenerative ocular changes and urinary symptoms, will aid in making a differential diagnosis.

The symptoms of cerebral congestion are just the opposite to those of uraemia, and are as follows: Face flushed, throbbing carotids, conjunctivae injected, temperature elevated, full, strong, rapid pulse, no twitching of the muscle and a history of exposure.

Convulsions or coma, which are seen in paretic dementia, chronic alcoholism and syphilis, can be detected by symptoms which point to organic disease of the brain.

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THE CARDIO-VASCULAR CHANGES OF RENAL DISEASE.

BY J. N. HALL, M. D., DENVER, COLO.

Many of the most striking features of nephritis, especially of the chronic forms, proceed from the changes brought about in the cardio-vascular system by the disease. These features are chiefly dependent upon the arterio-sclerosis, the high arterial tension and the hypertrophy of the left ventricle. The weakened vascular wall, unable to withstand the high tension, especially under some sudden over-action of the hypertrophied left ventricle, gives away and cerebral hemorrhage results; or from ob-

literative endarteritis the nutrition of the brain, the heart muscle, the walls of the large arteries where the vasa vasorum are affected, or other important structures, suffers, and a fatal result often occurs. The troubles are practically confined to the systemic side of the circulation, and are most pronounced in chronic interstitial nephritis. Although the exact relations between the high tension, the arterio-sclerosis and the cardiac hypertrophy are not yet settled, their association in well marked cases is constant.

In gout and in nephritis the smaller arteries are usually involved in the sclerotic process, syphilis having a certain predilection for the basal vessels of the brain, and muscular over-strain affecting chiefly the aorta and large arteries. The reason for the especial involvement of the renal arteries is supposed to be that they are particularly exposed to the irritation of the waste products they are called upon to eliminate.

The nodular form of arterio-sclerosis, according to Thoma, may lead to such localized weakening of the vessel wall as to favor the production of aneurism; the senile form may be very general, and accompanied by senile atrophy of liver and kidneys, yet the heart is often not enlarged, while the diffuse arterio-sclerosis, found rather in muscular middle-aged men, particularly negroes, is accompanied with marked hypertrophy of the left ventricle. Increased consistence is always to be found in the kidneys. Although the sclerotic changes in the arteries may not be particularly notable to the naked eye, under the microscope the evidence of this change is always decisive.

Mahomed believed that in the red granular contracted kidney the disease was generally primary in the vessels. The kidneys may be small, we are told by Osler, perhaps weighing no more than one ounce and a half, with great thickening of the small arteries.

The view most favorably received at present is that the chief trouble "is in the secreting tissue of the tubules and the glomeruli, and that the connective tissue overgrowth is secondary to this." Mott states that the capillaries of the glomeruli show the hyaline change especially well, and that they are thereby frequently obliterated.

Fagge, quoting Cohnheim, believes that the small vessels

of the kidney regulate the amount of blood to that organ, not in accordance with the amount needed for its nutrition, as in other tissues, but in accordance rather with the amount of waste matter contained to be eliminated. In case of destruction of portions of the kidney tissues the remainder must shoulder the whole burden, an increased pressure being obviously indispensable. To increase the pressure in this part of the vascular apparatus it is, of course, essential that it shall be maintained at a high point throughout the body.

Thoma, as quoted by Allbutt, found by injection experiments upon cadavers that fluid could be injected more readily and in much greater amount into the vessels of the subject free from atheroma than in one with marked arterio-sclerosis. He concluded, further, that the capillary walls in the latter case were much less permeable to fluid. Mott suggests that the capillary area of the general circulation is greatly diminished on account of the fibrotic changes.

In the brain, in addition to the usual atheroma, an added source of danger exists in the well known miliary aneurisms. It is thought that one reason for their great frequency here lies in the atrophy of the brain substance around the arteriole, and consequent loss of support to the vascular wall. Another reason is that the vessels are terminal in their nature, and derived directly from large trunks. F. W. Mott states that of 1,600 autopsies at Charing Cross Hospital there were sixty cases of cerebral hemorrhage. Thirty of these occurred in the subjects of interstitial nephritis with hypertrophy of the heart. Fagge lays stress upon the same point. Lancereaux, in sixty-one cases of arterio-sclerosis, found interstitial nephritis in fifty-three. We may readily conclude that the greatest predisposing cause to cerebral hemorrhage is interstitial nephritis with its accompanying arterial degeneration.

All these points considered, it is not strange that we have cerebral hemorrhage so frequently as the last event in chronic Bright's disease. We have the damaged cerebral arteries, with frequently the miliary aneurisms spoken of, and the high arterial tension because of the hypertrophied left ventricle. It is to be expected that, sooner or later, a little temporary increase in this

pressure, owing to sudden exertion or otherwise, will cause the fatal rupture. Mott states that apoplexy is rare, in the absence of cardiac hypertrophy, even though atheroma be well advanced.

The hypertrophy of the heart may not be confined to the left ventricle in extreme cases, but may involve all the cavities, and give an organ weighing three or more times as much as normal. This is probably in part due to the contraction of the muscular coat of the arterioles under the irritation of waste ingredients circulating in the blood and in part to the obliteration of much of the capillary outlet through the kidney, as mentioned by Traube. Many of the fibroid and fatty degenerations of the cardic muscle are directly due to atheroma of the coronary arteries sequential to interstitial nephritis. Deterioration of the muscular power in these cases means dilatation, relative insufficiency of the mitral valve, and dropsy of the lungs and finally of the whole system, if life be prolonged. The edema is in part due to the cardiac failure, in part to the capillary changes and the hydraemic condition of the blood. In these renal cases cardiac failure is of relatively greater importance than in others, since it is solely by virtue of the high tension that the kidneys continue to act. In the absence of a serious nephritis the outlook, while less gloomy, is nevertheless grave.

The direct source of the diminished blood supply through the coronaries is generally a gradually developing obliterative endarteritis, possible more marked in certain areas than in others. With such a condition there is always the danger of thrombosis or embolism, with sudden cutting off of the remaining blood supply and almost immediate death.

It is in just such cases as these that angina pectoris is so common. The frequent association of atheroma, angina and aortic regurgitation is to be noted. This form of valvular disease, in these cases, commonly originates in an extension of the atheromatous process of the aorta to the segments of the valve, while the regurgitation at the mitral orifice, as mentioned above, is by a totally different mechanism. The aortic leakage may supervene years after the renal, arterial and cardiac signs of interstitial nephritis are well marked. Thus I have examined this week a gentleman over 70 years of age, who, two years ago, had

an increased amount of urine, with albumen and hyaline and granular casts, hypertrophy of the heart to such an extent that the apex beat was to the left of the nipple, and calcareous arteries. With the exception of marked accentuation of the aortic second sound his heart sounds were then normal. He has now developed a long, soft, blowing diastolic murmur, traceable from the second right inter-space to the apex, undoubtedly due to regurgitation from a damaged aortic valve, and presumably by the extension of the atheromatous process mentioned.

Of gangrene of the extremities, especially the lower ones, from a similar process, we need not stop to speak. It does not differ essentially from that found in the absence of nephritis.

Owing to the narrow time limit necessarily imposed in this symposium, I shall touch but momentarily on treatment. Of prognosis it is necessary to say that it must eventually, perhaps only after years, in the cases with albuminuria, palpable arteries, hypertrophy of the heart, high tension, and consequent aortic second accentuation, be that of the senility of which it is practically an anticipation. It is probable that iodide of potassium does more good than any other remedy in mitigating the symptoms and delaying the progress of arterio-sclerosis. A diet such as one would recommend in gout, with free use of mildly alkaline mineral waters, is in order. The nitrites are most likely to relieve the high tension and associated dyspnoea, anginal pain and headache. The eventual cardiac failure and the accidental complications of the disease must be treated as under other conditions.

RENAL HAEMATURIA AND NEPHROLITHIASIS.

BY FRANK FINNEY, M. D., LA JUNTA, COLO.

The proportion of cases of renal haematuria to all cases of blood in the urine, according to a tabulated statement of Fenwick, made from the records of his first hundred cases, examined by the electric cystoscope, shows twenty-four renal cases in the

hundred. This does not include bleeding from cases of gonorrhœal prostatitis and ordinary nephritis. This is perhaps a fair index of what we are to expect in the average run of cases of haematuria. Say about one-fourth of all cases are renal in origin. Of course, this statement is subject to change as the investigation of cases goes forward by means of the electric cystoscope, catheterization of the ureters and other physical means now at our command. The causes of hæmaturia are very numerous. Some of the causes assigned in the older works on the subject have been found to be mythical in the more perfect knowledge of later investigation. The principal recognized causes of renal haematuria are:

Renal calculi, acute infections, syphilis, tuberculosis, traumatism, renal abscess, embolism, malignant diseases of the kidneys, hydatids, the haemoragic diathesis, malaria, influenza and glandular fever.

DIAGNOSIS.

In arriving at a diagnosis of the source of a urinary hemorrhage we are not to rely wholly upon the cystoscope and the ureteral catheter to the entire exclusion of other and older plans, for these two diagnostic methods are not applicable to all cases. In the presence of haematuria we are to ask ourselves as to the source of the cause of the bleeding. The diagnosis may be made from the history of the case, the examination of the urine and the examination of all the organs.

History should include inquiry into the family history, previous personal history, age, time at which the blood appears in the urinary flow, frequency and duration of attacks, and the effects of exercise, or complete rest, in the course of an attack. The urine should be examined macroscopically, microscopically and chemically. Other organs, as the heart, lungs, spleen, etc., should all be carefully examined, for their condition may suggest the origin of the hæmaturia.

First, History of the case:

The appearance of blood in the urine is, as a rule, preceded or accompanied by pain or distress in the kidneys, ureters, bladder or urethra, and hence the source of the hemorrhage can

often be located by the symptoms alone. There are, however, a small class of cases that give no such symptoms, and which have been grouped in a class by themselves, under the head of symptomless hæmaturia.

All accurate history as to the character of the onset is of great importance in making up the diagnosis of the site and cause of the bleeding. The family history, especially as to tuberculosis and syphilis, should be inquired into. The personal history as to previous venereal disease.

Hæmaturia is much more frequent in the male than in the female.

Age: Before the age of 5, the causes of hæmaturia are more commonly those due to scorbutic troubles from dietetic errors renal concretions come next in frequency, and sarcoma of the kidney is rare.

Between puberty and 20, tubercle of the bladder and renal stone furnish the larger proportion.

Between 20 and 30, congestions due to venereal disease, tuberculosis, chronic Bright's disease, and stone cause the larger number.

From 30 upward, the above causes grow less frequent, while carcinoma and certain forms of vesical papiloma become more frequent.

In the acute infectious diseases, such as small-pox, measles, typhus, etc., the origin is always renal and the symptom is looked upon as a very grave one.

Certain drugs, notably turpentine and cantharides, will produce hæmaturia either of renal or vesical origin. Where slight indirect violence causes hæmaturia, renal stone or malignant growth in the kidney or bladder is to be expected and looked for.

Where we have a hæmaturia which is lessened or relieved entirely by absolute quiet and rest, renal stone is to be suspected, although certain forms of carcinoma, tubercular ulceration and villous growths of the bladder will be similarly affected.

The causes of so-called symptomless hæmaturia of a renal origin can usually be traced to some form of malignant disease of the kidneys, or to latent stone or granular kidney or syphiloma.

In these cases the onset of the hæmaturia is the first notice given of the disease.

Examinations of the urine:

"The brighter and more arterial the color of the urine, the nearer the source of bleeding is to the meatus urinarius."

The exceptions are severe renal injuries and in some cases of sarcoma and carcinoma where the blood is rapidly poured from the kidneys. The smoky or beef tea looking urine indicates hæmaturia of a renal origin, but this should be confirmed by the microscope and the urinometer.

When clots are passed with the urine, the shape and color of same are an index of their source, i. e., long, slender, worm-like clots come frequently from the ureters, and indicate renal bleeding, while large, irregular, bright clots indicate a bladder or prostatic origin. The time at which the blood appears in the urinary flow is of importance. If the blood appears at the end or after the act of urination, the source is most surely prostatic or vesical. This is due to the congestion induced by vesical contraction and its influence on abraded or ulcerated surfaces at its base. Bright blood at the beginning of urination is generally urethral in origin. Dark blood or clots may precede the urinary flows which are of renal origin, having settled to the lower part of the bladder by gravity, as they would in conical glass.

The hæmaturia caused by renal stone does not differ from that caused by other affections, except in the fact that it is generally made worse by exercise or sudden movements. This is especially true if the calculus is situated in the pelvis of the kidney, or in any way comes in contact with its mucous membrane. Many imbedded calculi do not give rise to hæmaturia, as has been often proved by nephrolithotomy.

"As a general rule the bleeding in pelvic calculus is often repeated, dependent on, or distinctly increased by exertion. It is rarely profuse, the color is never very bright, and the blood is always intimately mixed with the urine."

In plethoric and gouty subjects the blood often appears in the form of a dark coffee colored sediment mixed with uric acid gravel.

"Renal concretions of oxalate of lime are more apt to produce hemorrhage than any other variety."

"Hæmaturia due to stone in the kidney, is not so apt to occur where pus is freely passed in the urine."

Treatment.—I will not in this paper attempt to outline the general and special treatment of renal hæmaturia, but will merely briefly outline the treatment for renal hæmaturia in nephrolithiosis. This must vary in accordance with the character of the urinary deposit found to exist. With a uratic condition and freedom from pus, the chief feature of treatment will be rest, with avoidance of alcohol and all stimulants, and free use of bland alkaline waters.

"Hemorrhage in oxaluria and oxalate of lime calculus is more difficult to arrest. Absolute quiet and strict regimen should be enforced. Avoid al uncooked fruits and all sugars, with exhibition of the mineral acids."

When the calculi are phosphatic, the urine being alkaline, the treatment by citro-borate of magnesia, or a combination of boric acid and benzoate of soda will best serve to allay the hemorrhage.

When pus is present, as well as blood, some of the balsamic drugs, exhibited in capsule form, are of value. The skillful performance of nephrolithotomy is without risk when suppuration has not occurred. This, however, is a subject which deserves greater space than the limit of this paper allows, and I will therefore close with an acknowledgment of very free use of Dr. Fenwick's admirable article on the subject, in the Twentieth Century Practice.

GOUTY AFFECTIONS OF THE KIDNEYS.

BY RICHARD K. MACALESTER, M. D., GLENWOOD SPRINGS, COLO.

Etiology.—The association of gout and diseases of the kidneys is so frequent, that some of the most experienced observers maintain that these organs are rarely found in healthy or adequate condition after gout has become fully established.

Statistics, compiled by Luff, of the autopsies of 77 cases of granular kidney disease, show uratic deposit in 41, whereas in those described as markedly, or typical granular kidneys, the proportion is 26 to 20. Furthermore, the close relationship between gout and renal disease is amply demonstrated by the well recognized fact that certain toxic agents, such as lead and alcohol, are productive of both disorders. But, notwithstanding our recognition of the frequent co-existence of the two diseases, and the unrelenting labor of many eminent investigators, the much mooted question as to whether gout is the primary causative factor of kidney trouble, or *vice versa,* is still a matter of controversy.

The *role* of uric acid in the etiology of renal disease, as also in other conditions, is a most perplexing problem. By some observers it is assumed that uric acid and its compounds, acting as a chemical irritant circulating in the blood, set up a destructive process, starting in the epithelium of the convoluted tubes. On the other hand, it has been shown that uric acid is present in the blood only as the soluble sodium quadriurate, an inert, non-toxic compound, and it is only under abnormal conditions that it deposits, in various parts of the body, in the form of the neutral biurate, and becomes an irritant. Finally, uric acid may be present in the blood in large quantities, as for instance in leucocythæmia, but rapidly excreted without causing any damage, as long as the kidneys are in normal condition. It is claimed that only when the function of these organs is primarily impaired there is deficient elimination of uric acid, with all its evil consequences.

Symptomatology.—The clinical symptoms comprise secondary disorders, resulting from renal insufficiency, and differ in no way from those of other forms of chronic interstitial nephritis except for the co-existence of gouty manifestations. As these last named begin to become more chronic, it is not uncommon to find the urine increased in quantity, of low specific gravity, 1006—1015, with a deficient amount of urea and uric acid, and a small quantity of albumen; microscopically, there are usually few epithelial or granular casts present. Concurrent with these urinary changes are cardio-vascular alterations, evinced by hyper-

trophy of the left ventricle and sclerosis of the arterial system, the arteries becoming hardened and tortuous, and the pulse of high tension.

The course is usually that of the extremely chronic type of Bright's disease, extending often over many years. At first the gouty symptoms preponderate in the clinical picture; later these subside to a great extent, and as the renal trouble progresses, the patient feels relieved of his gout, but finally succumbs to exhaustion, general dropsy, or uræmia.

In a goodly number of urinary analyses of gouty patients, made by me during the past three years, the above enumerated findings have sometimes been obtained; but by no means in the majority of cases, even in which gout has become eminently chronic, does the urine reveal the co-existence of kidney disease. But common to all cases of gout, as well as lithæmia, its next door neighbor, my quantitative urinanalyses show, without exception, a marked diminution in the daily amount of urea excreted, quite independent of the slightest evidence, either chemically or microscopical, of a co-existing renal lesion. I report this observation here, being unable to find in the literature, notwithstanding an extended search, any record of this deficient urea-excretion, except in conjunction with Bright's disease and general marastic conditions, and I hope to be able to collect enough material to present more conclusive results in a future communication.

Pathology.—The so-called gouty kidney is identical in appearance with the small, red, granular kidney of other origin. It is much contracted, with a shriveled, granular surface, and the capsules thickened and adherent. The decrease of size is chiefly at the expense of the cartical portion. Microscopically, there are present the signs of destruction of the renal parenchyma with connective tissue formation, degeneration of the epithelium of the uriniferous tubules and the glomeruli, and endarteritis obliterans of the larger arteries. Deposits of uric acid and urates, appearing as white streaks in the direction of the tubes in the pyramidal portion, and little white points in the cartical, were attributed to the gouty origin of the trouble, but since these same concretions have been demonstrated in the kidneys of very young

children, and in other conditions, they cannot be considered pathognomonic.

Besides the small contracted kidney, large and mixed granular forms have also occasionally been met with, and described as dependent on gout.

Treatment.—There being no specific for Bright's disease, we are compelled to take recourse to symptomatic treatment, dietetics, regime and climate. These vary but little in the different forms of chronic nephritis, and have been thoroughly discussed in other papers. Moreover, broadly speaking, when kidney disease and gout co-exist, a course of treatment, proving beneficial to the one, agrees, fortunately, admirably well with the other.

My experience in the treatment of these troubles with mineral water baths has been so encouraging as to induce me to allude to the balucological aspect in this place. We have in Glenwood Springs an unique establishment, known as the Natural Vapor Caves. Thermal springs, boiling up in these, charge the space with vapor and gases, and raise the temperature to 110° to 112° F. A few minutes stay in this atmosphere suffices to set up an intense cutaneous reaction, perspiration continuing for several hours after leaving, if not checked. The other varieties of baths, though acting in a lesser degree of intensity, still exert a sudorific action far in excess of plain water. The cave baths, especially, have proved to be powerful eliminating and absorbent agents in ridding the body of large quantities of water and metabolic waste products, and, in renal disease, relieving the inadequate kidneys and reducing œdema. Indeed, the support given the kidneys is in some cases remarkable, and substantiated by observations of, for instance, inebriates with alcoholic nephritis in whom the outbreak of delirium has been apparently averted by the timely application of the baths in conjunction with rational medical treatment. Thus, my experience leads me to believe that our mineral baths, under proper medical direction, are a valuable adjunct in the treatment of renal disease, and in gout their action is nothing short of specific, the benefit derived therefrom being not only temporary but often lasting. During the "cure" the internal administration of Yampah water is useful; acting as a mild laxa-

tive, it also stimulates the functions of the liver and gastro-intestinal tract, and improves the condition of the latter.

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X-RAY IN DIAGNOSIS OF KIDNEY DISEASE.

BY GEORGE H. STOVER, M. D., DENVER, COLO.

For some purposes in renal surgery, the X-ray is claimed by certain men, particularly by Leonard, to be of very decided value or almost indispensable. Leonard claims that information as to the presence of calculi in the kidney may be derived from skiagrams with much more certainty than by other methods of examination. He cites one case which had three calculi weighing less than one grain, which were shown by a skiagram; in 136 suspected cases, a negative result was obtained in 100; in only one of these was the diagnosis disproved by operation, and in that instance the error was believed to be due to a defect in the plate on which the skiagram was taken.

Dr. Keene removed a calculus 12 millimeters in diameter, which two skiagraphic examinations had failed to discover.

Dr. Williams, of Macon, Ga., reports three unnecessary operations which were made, due to the false information given by skiagrams.

It requires a great deal of skill to properly interpret many skiagrams, and it may be that some errors are due to faulty interpretations of skiagrams.

Personally I am not so enthusiastic in this matter as some others are. Several years ago I made a fluoroscopic examination

in a case sent by Dr. Van Meter but failed to see a very large calculus which the doctor subsequently removed. A skiagram which I made a while ago for Dr. Parkhill did not show a calculus, and in the operation upon this kidney for another condition, no calculus was found.

It should be remembered that only calculi consisting of oxalates and phosphates are shown by the X-ray, the other varieties casting no shadow.

THE KIDNEYS DURING PREGNANCY.

T. MITCHELL BURNS, M. D., DENVER, COLO.

Because of the increased work and the increased intra abdominal pressure the kidneys are easily affected during pregnancy.

To keep the kidneys in a normal condition it is necessary to keep all excretory organs active. Hence bathing and laxatives are very beneficial during pregnancy. As an albuminous condition of the blood seems to favor albuminuria, meat should be eaten sparingly. Exercise, to the point of fatigue, favors the elimination of waste, and, therefore, is of value; plenty of pure water flushes the kidneys, as do many fruits.

The urine of the pregnant woman should be carefully examined two or three times at least, but it is very rare that a pathologic condition of the kidneys is found without one of the following symptoms of threatening uremia being present, viz., severe or continuous frontal headache, severe epigastric pain, weak eyes with spots before them, spells of blindness, or in the latter months nausea and vomiting. The headache and epigastric pain are very suggestive if the bowels are acting regularly. Nausea and vomiting and oedema very often occur in the latter part of pregnancy without any kidney disease.

Whenever any albumen is present, or there is any indication of kidney disease, the patient should be restricted to a milk and

white fish diet as nearly as possible, frequent warm baths, plenty of water to drink, but of most importance besides the diet is Basham's mixture, mistura ferri et ammonii acetatis, two drams, every three or four hours and salines for the bowels. With the above treatment carefully carried out the improvement is often wonderful.

Any patient who has had albuminuria is in danger of uremia or eclampsia, and these should be prevented by the above treatment, and upon the appearance of any nervous symptoms 30 grains of chloral, per rectum, followed by chloroform inhalation, if necessary, and during the labor, whether the nervous symptoms appear or not, the chloral and chloroform should be used.

If the albuminuria, or other symptoms, increase after the above treatment is fairly tried, which will be very rare, consultation should be had, and if its suggestions fail to relieve, the induction of premature labor may be considered. If eclampsia occurs, everything should be done to favor rapid elimination by the kidneys, liver, bowels and skin, to quiet the nervous system and diminish the intra-abdominal pressure. To favor elimination by the kidneys, catheterization of the bladder, hot fomentations to the lumbar region; for the kidneys and skin, warm water or steam baths; for the bowels, oleum tiglii, two or three drops in syrup on the tongue, an ounce each of epsom salts and glycerine in sufficient water to dissolve, per rectum; for the nervous tension and intra-abdominal pressure, besides the above relaxing agencies, chloral, chloroform, venesection, four to six ounces (if face is congested), and rupture of the membrane. Morphine is often of great value by lessening the severity of the uterine retraction, and pilocarpin and veratrin veride are frequently of great value, but they are dangerous drugs, and should be used with great care. If the pulse weakens, subcutaneous injections of normal salt solution should be employed.

As empting the uterus generally stops the convulsions, gentle manual dilation and extraction, the foreceps, or the Caesarian section, should be resorted to in select cases. The Caesarian section has been performed of late for the cure of eclampsia

with good success. It is possible that by simply opening the abdomen that the diminished intra-abdominal pressure may sufficiently relieve the kidney and nervous tension until birth can occur by the natural passage.

PUERPERAL ECLAMPSIA.

BY HUBERT WORK, M. D., PUEBLO, COLO.

As between eclampsia and convulsions, the former is used to designate seizures that rapidly recur, and is not applied to an isolated fit, as in a child developing an acute fever or other causes than primary states of the brain.

The term implies, too, that the cause is outside of the brain —acting upon it—and not originating within it, as organic brain disease.

The essentials of puerperal eclampsia are unstable nervous centers, from physical enfeeblement, heredity, humiliation of illigitimate pregnancy, or the dread of delivery, subjected to a toxic irritation to which they are susceptible.

Primiparity is prominent as a predisposing factor because albuminuria is more frequent in first pregnancies, the greater abdominal pressure, nervous excitability and the longer labor. Pluriparity, also, for similar reasons, with the additional one of an increased demand upon the eliminating functions of the kidneys.

Heredity is important only in that it may have transmitted an unstable nervous organization. The mental state during gestation is of greater moment, as the anxiety and shame of an illigitimate pregnancy predisposes to exhaustion of the centers by insufficient nourishment and anxious dread.

The brain centers, already enfeebled through lack of food and sleep, subjected to the prolonged devitalization of a toxic blood state, are being incessantly shocked by nervous discharges received from the peripheral irritation of the gestating womb.

Not only is their inhibitory power incalculably impaired, but the demands upon it are many times multiplied.

Normal pregnancy causes an abnormal state of the nervous centers, evidenced by the frequent occurrence of emotional and functional disorders. If conjoined to it the predisposing causes combine, the excitant may in itself be very slight. Digital examination, pressure over the abdomen, a distended bladder, or the child's movements, may precipitate a seizure, which if pending, may be suspected from an increased arterial pressure. The pulse is a good guide to kidney elimination, as toxic material circulating in the blood causes vaso-motor constriction. Headaches, mental hebetude, gastric derangements, or impaired vision, are each significant, to which if co-existing albumen is found, escape from eclampsia is improbable.

The onset is sudden, and the convulsion resembles that of epilepsy. Often the tongue is bitten and the bladder and bowel emptied. A difference is that the two sides are involved, not simultaneously, but successively. The facial muscles of one side become contracted, followed by a tonic spasm of the muscles of the same side of the trunk.

I witnessed an attack beginning this way: The head turned to the right as an easy birth was being completed. The eyes turned in the same direction, with twitching of the lids, but not of the convulsed facial muscles. The right arm and leg were rigidly extended, then forcibly flexed, whether pronated or not I cannot recall. The same phenomena then occurred in the left side. The spasm rapidly became general and clonic in character. The eyes oscilated horizontally. The lacerated tongue protruded and the spasm passed off in the order of its onslaught, leaving the patient dazed, but complaining of cephalalgia and loss of vision. These seizures recurred each hour for six hours; three times during the next eight hours, growing less frequent and violent, but with gradual deepening stupor and rapidly rising temperature, death occurring in 22 hours from the initial attack, after profound coma of some hours.

This patient embraced within herself every essential for puerperal eclampsia. Always delicate, tenderly and indolently reared, shrinking, timid temperament, anemic, poorly nourished,

never exercised, constant dieting for imaginary ills; pregnant the first time at 35 years, with a urinary secretion charged with albumen. That she should perish in the parturient crisis is but a logical sequence.

Whether the diseased kidney is the primary cause, detaining normal toxic waste matter in the circulation which attacks the brain, or that a poison peculiar to gestation is formed in the foetal economy, or in the alimentary canal, which impairs the kidney as well as the brain, is yet conjectural.

That the death of the foetus, or its rapid removal, will terminate eclampsia, and be followed by functional restoration of the kidney, together with the fact that parturient fits have occurred without the co-existence of nephritis having been proven, would seem to strengthen the position of those who hold that the state of the kidney is coincident, and not causative, as the peripheral irritation from the gravid womb is then alone removed.

That albumen is present in the vast majority of cases, however, there can be no doubt. That the eclampsia is uremic alone has been abandoned. But, that the excitant is a toxine from which the brain can be protected only through the integrity of the kidney, is established.

DISCUSSION.

Dr. Eskridge: I shall not attempt to discuss the papers read on diseases of the kidney further than that which relates to the diseases and disorders of the nervous system. With what Dr. Pershing has said in regard to pain of the kidney, commonly called nephralagia, I quite agree. I think that we may all take it for granted that pain is an index of weakness, and that we all have what may be termed a pain level, which, if our vital energy falls below we suffer pain, and pain in that part which has less resistance. When a person is in excellent health he may be said to be above his pain level, and cannot, without some depressing influence, fall below it, and thus does not suffer pain. Pain in any portion of the body simply indicates that this portion has a less power of endurance than that portion of the body which is not the seat of pain.

In regard to the subject of Dr. Work's paper, uremia, I have seen, during the period of over 25 years, a great number of cases, and some I observed with my preceptor while I was a medical student, some 30 years ago. Uremic convulsions form a subject of great interest when carefully studied. First, I noticed that unmarried girls that gave birth to children, mothers that bore children under depressing circumstances, enduring great fatigue during labor, and those that had great apprehension for their life during the lying-in period, were much more likely to suffer from what is called uremic convulsions than women happily married, surrounded by pleasant circumstances, freed from care and worry and supplied with all that is necessary to make a woman in this trying ordeal feel that she had help in her hour of need. This has long led me to believe that convulsions occurring during childbirth were largely due to shock, the brunt of which is borne by the nervous system.

With reference to Dr. Hopkins' paper, the temperature, if changed much from the normal in hemorrhagic apoplexy, is lower on the paralyzed side immediately after the stroke, and is frequently below normal in both axilla, but as soon as reaction takes place, 10 or 15 hours later, the temperature is usually normal, or slightly above, and is higher on the paralyzed side, and then remains slightly higher on this side until the temperature reaches normal. In the worst cases, which remain hemaplegic, it is slightly lower on the paralyzed side as soon as degeneration and failure of nutrition is shown on this side. Unfortunately, the temperture plays but little part in uremic troubles in which the temperature is usually normal, unless it is raised by some temporary condition, either of the lungs or other portion of the body. The presence of double choked discs does not always exclude uremia or renal trouble. I saw, about two years ago in St. Luke's Hospital, a patient suffering with double choked discs. The examination of his urine revealed typical degeneration of the kidneys, and other symptoms pointed positively to tumor of the brain. This man is still living. The renal trouble has almost subsided, but the tumor symptoms are still prominent. We may conclude from this case that a tumor and Bright's disease may occur in the same patient at the same time, and experience leads us to the

further conclusion that a condition of the eye, closely resembling double choked discs, may be due to disease of the kidneys.

Dr. Davis: It has been my fortune—or misfortune—in former years, while engaged in general practice, to have had experience with a greater number of cases of puerperal eclampsia than usually falls to the lot of an individual engaged strictly in private practice. While this is so, and while in several of my cases the eclampsiac attacks were followed by profound comas, I have had the good luck to see them all recover. My management of these cases was substantially: First—A hypodermic of one-quarter grain of morphia, followed by rectal enemas of chloral in solution. The amount of chloral used, each case decided for itself. Beginning with 40 grains, I repeated hourly, and in increasing amounts until convulsions were overcome, when I would proceed to deliver, and deliver rapidly. One case I remember to have given as much as 120 grains of chloral before overcoming spasms. While albuminuria generally either precedes or follows in puerperal eclampsia, I do not believe they are always due to uremia; for, in some cases albuminuria is entirely absent throughout, while in other women whose urines may be loaded with albumen before, during and after confinement, uneventful deliveries are frequently observed.

Dr. Wilson: I have had some experience in these cases of puerperal eclampsia, and I desire simply to make a few suggestions in addition to those made by Dr. Work.

Two months ago I received a hurried summons to the bedside of a primipera who was expecting confinement any hour, but, without indications of actual labor, had been taken with a severe convulsion. She was slightly comatose, but soon could be aroused sufficiently to swallow a drachm of bromidia in water. Chloroform was given continuously as an inhalent, until the bromidia had time to produce its quieting effect. Experience has taught me that bromidia is a more certain remedy than chloral alone, for its other constituents make it an admirable combination, all intended to accomplish the same purpose. Knowing that these convulsions very generally continued until the expulsion of the fœtus, I ruptured the membranes to expedite labor, notwithstanding the fact that the convulsions generally cause labor

to set in, which it did promptly. The chloroform was given whenever any signs of distress or nervousness presented themselves, and the bromidia was repeated in drachms, or one-half drachm doses, as indications seemed to require. Two drops of croton oil were given in a little sweet oil by the mouth. Later, when the convulsions returned in an unguarded moment, the chloroform was given with greater constancy and the bromidia in more frequently repeated or larger doses. Veratrium veridi was administered in a 10-drop dose, in lieu of blood-letting, which might have been resorted to had the patient been more robust and full-blooded. Following this general line of treatment, and in addition wrapping the body and limbs in blankets wrung out of hot water, and repeating the veratrium viridi in five-drop doses in two hours after the first dose, thus with the croton oil getting free catharsis and hot blankets causing diaphoresis and slowing the pulse with the veratrum, the patient went on to the delivery of a living child 10 hours after the first convulsion, having had altogether four convulsions. The bromidia and chloroform were kept conveniently at hand for a day or two, the former given in smaller doses for 10 or 15 hours after delivery. Only a trace of albumen was found in the urine before, during or after the delivery. Mother and child are doing well. A similar case to the one above reported occurred in my practice six years ago, with substantially the same treatment, saving both mother and child.

Dr. E. C. Hill: I should like to emphasize one point in regard to life insurance examinations. Some 10 years ago a young man whom I know was thrown out of life insurance on account of a trace of albumen, due to gonorrhea. The albumen disappeared with the urethral discharge, and he is in perfect health to-day. Again, in the case of a woman—a little albumen will sometimes appear in the urine on account of leucorrhea or menstruation. This false and insignificant albuminuria should be carefully distinguished, with the microscope, if necessary, from the true renal type.

THE ADMINISTRATION OF ANAESTHETICS IN RENAL DISEASES.

BY WILLIAM DOW, M. D., LA JUNTA, COLO.

In presenting this paper to the society I will limit my remarks to the consideration of the following anæsthetics, viz., ethyl bromide, nitrous oxide, ether, chloroform and the subarachnoideau injection of fifteen minims of a 2 per cent. solution of cocaine, the latter for operations below the diaphragm.

Before administering any anæsthetic in renal disease, in all cases except emergency ones, examination of the urine should be made beforehand for albumen, casts, urea and sugar, and not only the usual precautionary measures taken in the administration of an anæsthetic, but a preliminary preparatory treatment of the kidneys of an eliminative nature should be instituted. When albumen and casts are present, as in cases of Bright's disease and diminished excretion of urea, diuretics, moderate catharsis and daily warm baths should be given for a few days beforehand, in order that as little urea and other toxins, irritant to the kidneys, may be retained in the system as possible, and I use the infusion of digitalis with acetate or citrate of potassium as the diuretic, because of the tonic effect of the digitalis on the heart, which is so often diseased and weakened in renal affections. This preliminary preparatory treatment of the patient I deem very important, and may do much toward lessening the dangers, both at time of administration and after operation, from any anæsthetic in diseased kidneys. The mode of administering the drug is also important, and if chloroform is used, from fifteen to twenty minutes of times should be consumed in putting the patient under by the drop method. Ether, when used, should not be crowded at first and some admixture of air allowed. As the evil effect of the anæsthetic upon the kidneys is in proportion to the amount used, it is essential to safety that no more of the anæsthetic be given than is imperatively demanded for the operation, and the method much practiced in England, and now used

in the Johns Hopkins University, and other hospitals, of giving nitrous oxide gas to rapidly induce unconsciousness, and then continuing the anæsthesia with ether or chloroform, whichever may be selected, is, I believe, an excellent practice and minimizes the amount of the more powerful and much more dangerous drug used. The only exceptions to this rule of producing anæsthesia are in cases of diabetes mellitus and marked atheroma of the blood vessels, in which cases nitrous oxide is contraindicated, it having been shown that the gas inhaled sometimes produces a glycosuria, and its very rapid and great dilating effect on the blood vessels raises arterial tention to a point of danger from apoplexy, when the coats of the vessels are markedly degenerated; in this latter condition of arteriosclerosis the same objection to the action of ether holds good, though to a much lesser degree. Nitrous oxide, except in the instances just named, have been shown to be almost innocuous. A Bennett inhaler is used for its administration at the Johns Hopkins, followed by ether. Of 12,941 anæsthesias by this method in St. Bartholomew's Hospital in London, only one death occurred. By this method of producing unconsciousness and administering the ether or chloroform for more prolonged anæsthesia, the amount needed of the more powerful drug is lessened. Ethyl bromide should be substituted for nitrous oxide in diabetic patients.

In considering the selection of the two most commonly used anæsthetics, viz., ether and chloroform, in advanced diseases of the kidneys the consensus of medical authority is in favor of chloroform being the safer of the two, but only on account, as stated by Professor Hare, of the lesser quantity required, its irritant properties, quantity for quantity, being at least equal if not greater than that of ether. If we only had to decide on the drug to use in renal disease per se, we could much more easily determine upon which one to select, than what we find to be a clinical fact, met with in practice, that in most cases of renal affections we have complicating heart lesions, weakened and degenerated cardiac muscle, and secondary atheroma of the arteries. Ether is much safer than chloroform in weak hearts, but more likely to be followed by retention of urine and inflammation of the kidneys and also more dangerous in atheroma of vessels, be-

cause of rapid raising of arterial tension, rendering the risk of apoplexy greater. Bronchial irritation and œdema of the lungs are also more likely to follow its administration. So we find that in making selection of a drug for anæsthesia in renal disease, we have not only to consider the kidneys, but to take into consideration also the heart complications, which exist in a large percentage of cases, as well as atheroma of vessels, the secondary conditions sometimes claiming more attention than the renal disease itself. Professor H. C. Wood believes that in atheroma with weak heart, ether is to be preferred; in atheroma with diseased kidneys and a normal heart, chloroform is to be preferred.

The finest of judgment will often be required in making selection, and the fact that chloroform causes death in more than four times greater percentage of all cases than ether, should. I believe, place the balance in favor of the latter, where the complications make it a matter for fine judgment, or what is preferred by some (among them H. C. Wood) may be practiced in cases of weak heart, with moderately hardened blood vessels, complicating diseased kidneys, making doubtful cases, ether anæsthesia, used at first, until its stimulant effect on the heart is obtained, and then continue the anæsthesia with chloroform, in this way the least possible strain being put on the heart and kidneys. This separate use of the two drugs in a single case, I believe is to be preferred to the A. C. E. mixture of the English, in which the difference in volatility of the drugs makes it too uncertain the amount of each that is being taken up by the circulation. Subarachnoideau injection of fifteen M. G. of cocaine in a 2 per cent. solution into the lower part of the lumbar region of the spinal cord, as practiced lately, is still in the experimental stages. Professor Tuffier, who has operated many times with anæsthesia produced by this method, has included in those operations cases of nephropexy and nephrectomy, without apparent evil after effects. Petesti, who operated 125 times, cautions against its use in renal diseases, believing it unsafe in those cases, while Dr. John S. Miller states that the renal organs, with the heart and respiration, are not so seriously disturbed as by the inhalation method. Its comparative safety in renal diseases with that of drug anæsthesia by inhalation, cannot at the present time be estimated.

TUMORS OF KIDNEY.

BY F. N. COCHEMS, M. D., SALIDA, COLO.

In a paper limited as this it is impossible to go into a thorough exposition of the great subject, "Kidney Tumors."

From what I can gather in search of the literature, the most striking thing I noticed was that in the diagnosis of the malignant forms authors are much inclined to eliminate carcinomata from growths in children and young adults, and sarcomata from growths of the kidney in adults, sarcomata, however, being more common in adults than carcinomata in youth; also that such diagnoses as carcinomatous-sarcoma, adeno-carcinoma, fungus hematodes and the like are given little or no place, they rather placing these tumors in a single class as carsinoma and sarcoma.

It would appear that authors are very much at variance in their opinions as to the nature of many kidney growths, even when examined both macro and microscopically. Many tumors have been considered benign, even after removal and a subsequent careful microsopical examination has been made, and later demonstrated to have been malignant, through recurrence and metastasis.

On the other hand, a number of kidney tumors, considered malignant, have been removed, not even thoroughly, and no recurrence has followed. These tumors were also carefully examined microscopically. As Kelynack says: "Unfortunately, but little can definitely be said as to the true relationship of renal growths. As already shown, much confusion has hitherto existed in their nomenclature, and this has almost completely prevented any satisfactory attempt at a comparative study of the relationship of these neoplasms. Much careful investigation will be necessary before we can fully realize the import of structural arrangement."

Already it is clear that many forms not infrequently occur, the exact nature of which would be differently interpreted by different pathologists. Some of the difficulty arises from our im-

perfect knowledge of the embryonic elements from which certain of the growths would seem to develop. Our views, also, as to formations purely of a connective tissue, type and structures of an epithelial type may possibly have to undergo considerable modification. It is certain, at least, that epitheloid cells not infrequently arise from connective tissue elements, and cells undoubtedly sarcomatous may sometimes be arranged according to a manner closely resembling glandular structures. Again, growths apparently having a sarcomatous structure may be wanting in nearly all those characters which we are wont to associate with the term "malignant." As Allen and Cherry very well point out, "a histological structure closely resembling carcinomata, with alveolar arrangement, large epithelial cells, and bold nuclei, is compatible with clinical innocence."

They also show that the inactive neoplasms are often multiple, while the active ones are usually single. A marked feature of the inactive forms seems to be the presence of many thick walled vessels immediately around them. It must also be remembered that these inactive tumors are sometimes associated with other forms of morbid growths. Allen and Cherry, in their recent valuable investigations on the relationship of these growths, clearly show that the typical adenoma and the typical sarcoma both pass insensibly into pseudo-carcinomatous structures.

Many authors definitely declare that they have met with mixed forms of combined carcinoma and sarcoma. Ebstein, for example, says: "sarcoma may occur as a mixed tumor simultaneously with carcinoma of the kidney." To these the name of sarcoma carsinomatodes has been given. Some authors speak of cases approximating to this type under the term "adeno-sarcoma." Cases have been described by Abbe, Paul, Allen and Cherry and others. Abbe says of his case, "that it looked like an adeno-carcinoma, in which the stroma was formed of spindle celled sarcoma." In such cases the following arrangement is usually met with: Imperfectly formed renal tubules, columns of cells closely resembling that lining the normal tubules, cysta which sometimes show intracystic papillomatous development. A matrix made up of fibrillar and spindle cells with a variable quantity of round cells. In some instances secondary deposits have

been found elsewhere, notably in the lungs, which have reproduced the general arrangement found in the kidney. And while this is true of tumors of any organ, yet it seems much more common in tumors of the kidney.

Further study will doubtless throw much light on the nature of these neoplasms. Some of them evidently belong to the class of adenomata, others and possibly the majority are really sarcomatic. As Allen and Cherry well say: "As far as new growths are concerned, the renal epithelium behaves as a mesoblastic and not as an epiblastic formation, and that the tumors most closely resembling carcinoma in structure are not carcinomatous in nature or history.

Regarding the benign tumors of the kidneys, nothing new has been added. We have the lipoma, fibroma, myxoma, chondroma, osteoma, angioma, adenoma, lymphangioma and lymphademona. A third class of tumors and a very interesting one comes under the head of "adrenal" or "suprarenal capsule growths." This class of tumors perhaps more commonly found if search was more frequently made, therefore, was first described by Grawitz, who applied the name "struma supra-renalis aberrata." Bayard Holmes summarizes the literature on the subject as follows:

(1) These tumors can be found along the entire genito-urinary tract in as high as 90 per cent. of post-mortems, and are sometimes benign, sometimes malignant, but malignant in only a small percentage of the cases.

(2) The suprarenal capsule or adrenal body is a ductless gland essential to life. It secretes a substance which slows the pulse, contracts the capillaries and removes the pigment from the skin. When it is destroyed or removed, the patient dies, or if partially destroyed he takes on the condition known as Addison's disease. When the adrenal body is greatly increased in its function, the skin is blanched, the heart action is increased in power, but slowed, and the capillaries are contracted and the whole vascular system undergoes the degeneration known as arterio-schlerosis.

(3) About one-third of the tumors of the kidney appearing in adult life are of adrenal origin, but only a small portion of

these show a tendency to metastasis, and these metastatic foci are usually confined to the lungs or to the bones, and only rarely are they found in both places.

(4) A few of the adrenal tumors produce the symptoms of poisoning with the adrenal extract. The poisoning does not always seem to be proportionate to the size of the tumor.

(5) The removal of the tumor before metastasis takes place results in subsidence of the symptoms of poisoning. The tumors may be removed without loss of kidney substance, or by complete nephrectomy.

In the removal of this class of tumors Kolisko recemmends that great care be observed to ligate all vessels coming from the tumor before attempting its removal to prevent the production of metastases during the operation. The extreme vascularity of the tumor very greatly favors the development of secondary tumors.

In 29 cases collected by Lubarsch in which the primary tumors were situated either in the kidney or suprarenal capsule, metastases occurred twenty times. The secondary deposits were most commonly located in the lungs and liver, but the retroperitoneal glands, vertebræ, heart, thyroid gland, pancreas, diaphram, vena cava, inferior and mucous membrane of the bladder were also the seat of metastatic growths. Why in the presence of these neoplasms these peculiar physiologic phenomena occur, and again are entirely absent, is as yet unknown.

Sippy asks: "Are these tumor cells so intimately associated with an intricate network of capillaries under certain circumstances capable of secreting a substance having the physiologic effect of the normal supra renal gland secretion, is a question it seems to him that naturally arises from a consideration of the facts presented?" He also says that according to the latest interpretation, these tumors result from a sarcomatous growth of the perithelium of the blood vessels; such tumors are known as peritheliomata.

Professor Meusser reports a case of a young man admitted to his wards in a moribund condition with pulsating temporal arteries, markedly increased arterial tension everywhere present sufficient to suggest a provisional diagnosis of nephritis. Autopsy

showed multiple hemorrhages of the brain the immediate cause of death, with malignant tumor of suprarenal capsule and absence of apparent arterial changes and all other usual causes for cerebral hemorrhage.

While it would be unsafe to attribute the cerebral hemorrhages to increased arterial tention, yet from what has been demonstrated recently concerning the physiological effects of the secretion of the adrenals it would appear that in the absence of any other good and sufficient cause, we might consider this the cause, assuming that in this case the presence of the tumor abnormally stimulated the secretion of the active principle.

The increase in arterial tension after the intravenous injection of even a very small quantity is, according to Sippy, of Chicago, almost incredible, the mercury in the kymograph rising to nearly double the normal; after a few seconds it falls some, but remains above normal for several minutes.

The effect is best appreciated when compared with that of ergotine and digitalis, in which the kymograph shows but little increase in arterial tension. When administered in large doses death of the animal ensues.

Cybulski says that when death was directly attributable to the action of the extract, hemorrhages into the brain, heart and lungs substance, often accompanied by edema of the lungs, was invariably found.

It seems that from the standpoint of diagnosis the possible presence of this class of morbid growths must hereafter always be borne in mind. And as a therapeutic agent perhaps nothing has been introduced recently which gives promise of being of more real assistance to both the physician and surgeon in the treatment of various pathological conditions.

THE PRESENT STATUS OF NEPHRORRHAPHY.

BY C. K. FLEMING, M. D., DENVER, COLO.

Until within a recent date the treatment of movable kidney was purely empirical, but owing to extensive observation on the part of Becker and Lenhoff, and more recently by Harris†, the etiology of nephroptosis has become better understood and therefore the treatment has been placed upon a firm scientific basis.

Movable kidney is a more common condition than formerly supposed. Edebohls estimated that 20 per cent. of women were thus affected, while Harris, in his late article, places the figures at 56 per cent. This great increase is due to his perfected system of examination. It is found that women are more liable to be affected than men, and that the right kidney is most frequently displaced. The explanation given for these facts by these investigators seems based on sound argument, to wit: the body form.

We all know from our anatomical studies that the upper portion of the abdominal cavity of the female is relatively smaller in capacity than the male; not only is it contracted laterally, but antero-posteriorly. The effect of this is to crowd the contained organs and probably, under exciting causes, to displace them. The stomach lies more longitudinally, the liver is compressed, which depresses its anterior and posterior borders. This compression and depression naturally tends to crowd the kidney or tilt it in an anterior direction. Becker and Lenhoff, while systematically examining living subjects, found that by careful bodily measurements that "the relation between the body form and the location of the kidney is so constant, that by dividing the length of the body from the supra-sternal notch to the upper border of the symphysis pubis, by the least circumference of the abdomen and multiplying the result by 100, an 'index' will be found from which it may be confidently predicted in a given case whether the kidney will be found palpable or not." They learned that

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the average index was 77 C M S, and that the greater the index the lower the kidney was found; thus an index above 77 C M S and the kidney is usually palpable, but with an index below 75 C M S it is exceptional to find a palpable kidney.

Harris found several sources of error which might vitiate the results of measurement, so he has elaborated upon the method of Becker and Lenhoff. His measurements are taken by graduated calipers and are five in number, as follows: *First,* the upper lateral diameter taken on the plane of the widest diameter between the seventh ribs. *Second,* the middle lateral diameter, which is the greatest distance between the lower edge of the tenth ribs. *Third,* the lower lateral diameter is the greatest distance between the crests of the ilia. *Fourth,* the upper antero-posterior diameter taken over the lower end of the sternum to the spinous process directly opposite. This would be in the same plane as the upper lateral diameter. *Fifth,* the middle antero-posterior diameter, taken from the mid-line in front to the spinous process opposite, and on the same plane as the middle lateral diameter.

These measurements are always taken with the patient standing.

It is stated that "these five measurements present a formula which may be said to represent each a particular body form. By dividing the middle lateral diameter by the upper lateral and multiplying by 100, is obtained what is called "Index No. 2," in contradistinction to the index mentioned above, and is considered more reliable. "The average index No. 2, for negative cases is 85.26 C M S, and for positive 73.23 C M S."

According to these figures it would seem to be evident that with an index of 73.23 C M S or less that there would be a diminution of the capacity of the so-called middle zone sufficient to bring about displacement of its contents. And such seems to be the case, as Harris presents a tabulated statement of 126 cases to substantiate his theories.

Fortunately for the individual, every movable kidney does not demand surgical intervention, as a great many cases do not cause symptoms, while others are relieved by palliative means.

In a certain number of cases, however, the operation of nephrorrhaphy or nephropexy will be required.

The indications for operation may be stated to be: First, when palliative treatment has failed, and; second, in pathological conditions of the kidney arising from its mobility, i. e., hydronephrosis, nephritis, etc.

Unfortunately, operation does not always give relief, particularly when the patient is of the nervous type, for such individuals are likely to be confirmed neurasthenics. In those cases in which pain and gastric or urinary disturbances are prominent, much can be promised in the way of relief. If, however, relief is to be obtained by operation, the kidney must be so fixed that it will not be crowded as it was originally, for the same predisposing etiological factors being present a recurrence would result with a continuance of the distressing symptoms. The kidney, therefore, should be anchored at a point lower down than normal, in such a position that the ureter will enter at the most dependent part.

As my time is about up I will not attempt to describe an operation, but will state briefly that any one of the various methods described will probably serve the purpose of producing a symptomatic cure, provided the kidney is fixed in such a position as to conform with the statements above.

DISCUSSION.

Dr. Lobingier. Dr. Fleming is to be congratulated in having chosen for his paper a review of the recent exceptional work of M. L. Harris in the diagnosis of movable kidney. We can easily recognize in the deductions of Harris the most revolutionary doctrine which has been advanced on a surgical subject within the last decade. That his argument must be founded upon correct hypothesis will scarcely admit of doubt when it is remembered that out of 125 patients he did not fail of diagnosis in a single instance. Becker and Lenhoff had established by the jugulo-symphysis and the least abdominal girth measurements certain facts leading toward accurate data by mensuration; but is has remained for Harris, by an additional measurement and the determination of three zones—and especially by his method of calibration whereby superficial irregularities are discarded—to elim-

inate the error which embarrassed his predecessors in these studies.

While we may cheerfully accord to Harris the credit of a great discovery in the accurate diagnosis of movable kidney, there are methods of remedy other than the technique suggested by him which will continue to be in favor with surgeons. His belief that the peritoneum is the chief support to the kidney and its cushion of fat is not new, but there may and probably will be a serious difference of opinion among able men as to how the peritoneum and capsule shall be restored to something near their normal position. We are not quite prepared to discard the well tried technique of capsular anchorage for that of the peritoneum only.

Dr. Grant: There are few exceptions to the rule that ether should not be used in any surgical operation in which there are diseased kidneys. Chloroform in such cases is undoubtedly the anæsthetic of choice. It is also a well established fact that many movable kidneys that are operated upon are not relieved. It is not a settled question in surgery whether it is wise to penetrate the kidney in fixation, though it is often done. Senn's method of splitting the capsule, stitching it to the muscles and packing above and below the kidney has much to commend it; and further, in this operation there is no traumatism to the kidney. In neurasthenic subjects the operation is often unsatisfactory though generally successful.

Dr. Miel: My experience in the surgery of the kidney has been very moderate; nevertheless I will say a few words upon floating kidney. This diagnosis is too often made on insufficient evidence. Several instances of incorrect diagnosis have come to my notice where a person of previous comparative comfort had been caused unnecessary anxitey and anguish, with coincident detriment.

Dr. Craig: I would like to supplement the remarks that have been made on operations on movable kidney. It has afforded me much pleasure to note the importance that has been attached to this subject. It was my misfortune not to have heard the first paper on the program. The subject of movable kidney comes not a little before the gynecologist. As gynecologists it is the

rule to explore the kidney region. In one of every five or six examinations we find one movable kidney and sometimes two. The problem of operating each case is still an open question. In 90 per cent. of cases relief is to be attributed to the operation. The pelvic organs are, in every instance, to be examined. It is a fact that these patients sometimes complain for months and sometimes for years after fixation of the kidney. Whether it is due to the chronic appendicitis or gall stones must be determined. Those who are accustomed to catheterizing the ureters are more likely to discover strictures, stones, etc., than the general practitioner. I have done that in a few instances. In some instances, removing the appendix cures. Now, as to the method of fixing the kidney, I always fix it low. Formerly, I used to pass the needle through the kidney, but since having one instance of renal fistula, I have been in the habit of putting the stitches through the capsule only and firmly anchoring the kidney, and I am satisfied that this has given me better results and certainly avoided the danger of the above method.

THE TONSILS.

BY ROBERT. LEVY, M. D., DENVER, COLO.

Even a casual glance at recent laryngological literature reveals so many articles dealing with what had for years been considered well established facts concerning the tonsils, their diseases and methods of treatment, that one cannot but be struck with it all, and question the reason for the diverse opinions and the attempts of prominent authors to find satisfactory solutions for numerous problems.

In studying the structures known as the tonsils, we no longer refer to the collection of follicles situated between the pillars of the fauces, but think of the entire ring of lymphatic tissue which, according to Kayser (*Handbuch der Laryngologie und Rhinologie*), "runs from the tonsilla pharyngea to the region of the Eustachian orifice, from there to the posterior rim of the velum

palati, around the posterior palatal fold to the faucial tonsil, over the base of the tongue to the opposite side and by the same direction back to the pharyngeal tonsil." This ring is known as the "ring of Waldeyer," and includes not only isolated follicles, but large collections grouped in certain situations so abundantly together that distinct organs have been developed known as the pharyngeal tonsil in the vault of the pharynx, the faucial tonsils between the anterior and posterior palatine folds, and the lingual tonsil at the base of the tongue.

Diseases affecting these parts are found at all ages, but it is especially interesting to note that those of the pharyngeal and faucial tonsils are associated together in childhood, while those of the faucial and lingual tonsils are associated in adult life. We rarely find at any age one of these tonsils affected without involvement of some other portion of this lymphatic circle.

It is not the purpose of this paper to discuss the pharyngeal or the lingual tonsil, nor indeed to consider all of the diseases of the faucial tonsils, but I believe that one cannot successfully deal with one unless he recognizes to the fullest extent the relations existing between them all. This, then, in the author's opinion, is *one* important reason why many cases do not respond to the usual methods of treatment.

The anatomy, both normal and pathological, as well as the physiology of the faucial tonsils is still indefinitely understood. The embryology of the parts, from which much might be learned, has always been sadly neglected, comparatively few investigators having turned their attention to this important subject. From time immemorial the functions of the tonsils have been the subject of great variation of opinion. Among recent investigators, Dr. R. D. Fry, of Cleveland, after elaborate experiments and after numerous inquiries among prominent laryngologists, concludes that the "tonsil in man is a retrograde organ and has no function." On the other hand, Mangouly (*Vratch,* October 28, 1900, reported in the *New York Medical Journal*) concludes, after apparently careful experiments upon dogs, that the tonsils bear an important relation to the blood and that their integrity is an important factor in the struggle of the organism against the invasion of germs through the mouth.

A most comprehensive article by Ullman in the *Medical News,* January 26, 1901, also points out the important relations these structures bear to the economy and concludes, first, that the normal tonsil has a physiological function probably protective to the organism, but second, that this function is frequently impaired and the tonsils begin the nidus for the growth and distirbution of pathogenic organisms in the system. Many references might be made to authors of note, proving by both clinical and microscopic evidence, the important role played by the tonsils as portals of infection, while many others, notably Labbe in *Presse medicale,* August 3, 1900, have shown that the tonsils play an important part in hematopoiesis, and that the follicles of the tonsils by the extent of the epithelial surface are also a means of defense against microbian invasion. Here again, then, are numerous reasons why such diversity of opinion exists concerning the proper management of these structures.

The tonsils are subject to acute and chronic inflammation, infections, to disturbances in the character of their secretions, to development of hypertrophic or hyperplastic changes. These pathological processes must be considered as due to both local and constitutional causes. The local causes are dependent upon certain variations from the normal in the structure of the tonsils themselves, while the constitutional causes may be due to such systemic vices as rheumatism, lymphatism or systemic infection from absorption through the tonsillar tissue. It is extremely rare, in the opinion of the author, that the systemic causes exist alone, and, therefore one is forced to the conclusion that the local cause is the more important. Consequently, the proper management of the local condition should result in the prevention of subsequent diseases of the tonsils, such as acute amygdalitis, as well as chronic amygdalitis, whether attended with hypertrophy, degeneration or perverted secretion.

It is an established practice that when tonsils appear enlarged they should be removed. The patient is promised relief from all symptoms and immunity to after attacks of sore throat. The immediate results are often gratifying, but as time goes on one after another of these cases returns with recurrences, new hypertrophies, frequent attacks of amygdalitis, etc.

The conclusion is again forced upon one that there is something wrong in the management of these conditions. What, therefore, may be the solution of the vexing problem? How may we best preserve the protective function which so many good authors recognize and how may we overcome the conditions and etiological factors for which tonsils are responsible agents?

In the majority of instances, especially in adults, complete enucleation of the diseased tonsil should be performed. Whether there is simple hypertrophy or a diseased condition of the follicles unattended with hypertrophy, but giving rise to well defined symptoms, nothing short of complete removal will assure one that the symptoms will not return. Tonsilotomy will not suffice. The best method for complete tonsilectomy in adults is by the galvano caustic snare, for by this means the danger from secondary hemorrhage is the least, although it may even occur here. There are, however, many diseased tonsils which cannot be engaged in the snare, or for that matter in a guillotine. Here complete dissection of the diseased tissue may be accomplished by properly constructed galvano caustic electrodes. In all operations, whether by tonsilotome, snare, or dissector, the adhesions which so frequently exist between the tonsils and the anterior and posterior pillars should be removed by a proper knife or electrode.

In children tonsilotomy has its uses and certainly its advantages, for here the tonsillar tissue is not yet all pathologic, and one may by the rapid use of the guillotine remove the tonsil so that a decided concavity marks its former situation. A certain amount of tonsil structure remains to perform a possible function in the growing economy, at the same time that the child is relieved of the symptoms for which the operation was undertaken. Only in those cases in children in which recurrence after a former tonsilotomy has taken place, or in which there is a diseased condition without hypertrophy, such as is seen in adults, should the more difficult and radical procedure be undertaken.

Finally, I should insist upon the maxim that no operation upon the tonsils should be performed simply because the structure is not absolutely normal in appearance, but only when distinct and well defined symptoms exist referable to these organs as the obvious cause.

DISCUSSION.

Dr. Waxham: The removal of enlarged tonsils would seem a very easy matter, that any one might attempt with impunity, but such is not the case. The thorough and effective removal of the tonsils is not easy. This may be due to many reasons. The favorite instrument used by most physicians is the tonsilotome, and many possess but a single instrument and endeavor to remove tonsils of all shapes, conditions and sizes with this one instrument, and the result is necessarily unsatisfactory. It is quite impossible to thoroughly remove a very large tonsil with a small tonsilotome, and equally unsatisfactory to remove a small, flat or adherent one with a large instrument. The great difficulty is in not using an instrument adapted to the size and condition of the tonsil. If the physician were supplied with a number of tonsilotomes of different sizes and would only use the one appropriate for each case we would not hear so much complaint against this much-abused instrument. My favorite method of operating is to first anæsthetize the tonsil by injecting deeply into it, with a hypodermic syringe, a 4 per cent. solution of cocaine, applying the solution to the surface as well. Then selecting a tonsilotome, from which the transfixing hooks have been removed, appropriate to the size of the tonsil to be removed, I place the instrument over the tonsil and with a curved pair of volsellum forceps grasp the tonsil and draw it through the ring of the tonsilotome, when it is quickly and painlessly removed as well as most thoroughly.

The great majority of operations for enlarged tonsils are among children, and we are obliged to act quickly. With them the electric snare cannot be satisfactorily employed, but in the adult this method of operating is highly successful and satisfactory, as is well illustrated by the specimens that Dr. Levy has exhibited.

Dr. Gildea: The thing that has always impressed me about the tonsils is the fact that the trouble one gets is not so much from the tonsils as from the peritonsilar spaces. I feel very strongly that the trouble one gets in this region is not so much from the disease in the tonsils themselves as from the fact that the enlarged tonsils close the mouth of the peritonsilar

spaces and gas-forming bacteria are confined, and produce all of the symptoms so well known in quinsy and other diseases of this type. The theory explains the immediate relief one obtains upon the opening of a peritonsilar abscess. Not only does the pus escape, but gases more likely to cause the symptoms than the fluid enclosed.

Recently I have been obtaining excellent results in quinsy by washing out the supratonsilar space with Dobell's solution. In five cases out of seven the relief was instantaneous. In two of the cases there seemed to be infiltration so deeply placed that the point of my syringe would not reach it.

For a number of years I have succeeded in stopping the recurrence of quinsy by cauterizing the upper half of the tonsils, thereby leaving a space so great that no swelling of this gland would close the opening.

Dr. Levy: I do not wish to be understood that I have entirely discarded the tonsilotome. There are times when we can remove tonsils as thoroughly as I would like by means of this instrument, but one is much more likely to have severe hemorrhage, especially in adults, than with the use of the galvanocaustic snare. That portion of the tonsil which Dr. Gildea has mentioned and which is known as the fossa tonsillaris is certainly a bugbear to us all, and his good result was undoubtedly obtained by his thorough destruction of this portion of the structure. The lower portion of the tonsil is not so likely to produce quinsy sore throat as the upper and peritonsilar tissue.

TYPHOID FEVER, WITH AN ANALYSIS OF CASES.

BY W. T. LITTLE, M. D., CANON CITY, COLO.

The subject of typhoid fever, like that of tuberculosis, blooms perennially. We cannot glance over a medical program without seeing it, and that of the present meeting is no exception. There is but one explanation to this, however, and that is that no serious disease occurs oftener; and consequently no disease is of more importance to the physician than this one under consideration. The practitioner in the country lacks opportunity to observe large numbers of cases of any disease; but it is none the less his duty to record such observations as he does make, and he may possibly thereby be able to contribute a mite to the general knowledge of medicine. This is the excuse for this brief paper, which claims to present nothing original, but hopes to add confirmation to conclusions already drawn.

I have here attempted an analysis of twenty-five cases of typhoid fever, of which I have kept records, seen in private practice in Canon City during the past five years. Of these eleven were females with an average age of 18 years, and fourteen were males with an average age of 26 years. The youngest was a boy aged 2½ years, the oldest a man aged 48. All had lived in Colorado a number of years—none less than two years—with the following exceptions: A male aet. 38, who had lived here eighteen months, coming from Canada; a male aet. 27, who came from North Carolina three months before attack; a male aet. 35, who came from Nebraska five months before; and a female aet. 16, who came from Texas and was certainly infected before reaching Colorado.

In only one case was there a history of a previous attack seven years before.

At the onset twenty-one complained of headache and aching more or less in other parts of the body. One first complained of toothache, lasting a couple of days. Two first noticed nosebleed and vomiting. Two complained of severe backache but

had no headache, one of these also having severe diarrhœa and vomiting resembling an attack of cholera morbus. The attacks were ushered in with a chill in six instances, three of these being severe. Five had loose stools, four vomited, while only two noticed a cough. During the course of the fever, however, fifteen developed bronchitis, three cases being severe. Two of these were children aged 5 and 12, who developed well marked capillary bronchitis. Aside from bronchitis, no complications of the respiratory system developed.

While only two bled from the nose at onset, eight others or 32 per cent. had epistaxis later. One case, a man aet. 19, bled freely every day during the first week, slightly during the second and again profusely on the seventeenth day.

Eruption. The roseola rash or rose spots were present in twenty-one cases, or 84 per cent. In ten cases spots were found on the seventh day of the fever, and on the eighth day in four cases. In the case of a child aet. 5 the eruption did not appear until the fifteenth day. In the balance of the eruptive cases I either saw the patients first after the eruption had appeared, or I made no record of it the day it was first noticed. In most of those cases in which the rose spots were seen on the seventh day only a few could be found, from two or three to a dozen; but in two or three days usually a larger crop appeared. In five cases the eruption was thick at some period during the course of the fever. In all cases the spots appeared and disappeared in crops, occasionally leaving colorless papules or pigmented macules. In only three instances did I note sudamina, and these patients perspired profusely. One patient on the seventeenth day of fever broke out from head to foot with a thick eruption of urticaria, accompanied by a jump of 2° in the temperature. This was in the evening, and by morning it had disappeared. The following evening it returned on both legs below the knees, disappearing in a few hours. There was no way of accounting for these attacks. Although he was inclined to constipation, the bowels were moved regularly by calomel and ipecac with enemas. At times he suffered quite severely from pain in the stomach, but I could see no casual relation.

A girl aet. 11 showed a few spots after the seventh day.

On the twelfth day an intense erythema appeared, starting apparently in the right iliac region and passing over the abdomen and up the chest, gradually fading at the periphery. It seemed to be a solid sheet of typhoid rash, which, as it approached the chest and flanks, broke up into groups of papules closely resembling the blotches of measles, only of a brighter red, and then spreading up on the neck and face and down the arms, becoming a closely grouped, papular eruption. This was accompanied by no rise of temperature or any subjective symptoms whatever. The third day of this eruption it began fading and in four days there was no trace of it except a little desquamation in the palms.

Fever. The average temperature of all the cases was 101.3°. Five reached 105° during the course of their attacks. The highest average temperature was that of a boy aet. 12, whose average for twenty-three days, when the fever disappeared, was 103.4°. The lowest average temperature was 99.6° for nineteen days, when the fever disappeared, while six others averaged below 101°. The average duration of twenty cases whereof the record is complete was twenty-four days. The longest was sixty days in a male aet. 48, my oldest case, in which the temperature reached normal on the sixteenth day and remained there for three days, when it rose higher than before. On the thirty-third day it again reached normal and remained so for six days, and again ascended to its former heights. This could not be accounted for by any indiscretion of diet. This case, too, is the only one giving a history of a previous attack. The fever ended in one case in eleven days, in fourteen days in two cases, fifteen days in one and sixteen days in another. All of these showed the characteristic rose spots eruption. The two children in the course of their attacks developed an intermittent type of fever. In the boy aet. 5 it appeared on the thirty-fifth day, lasting until the end on the forty-eighth day. At 8 a. m. the temperature would be normal or 99°, and at 2 p. m. between 103° and 104°. Quinine was given in full doses but had no effect. During this time the appetite was keen and the general condition good. The other boy, aet. 2½ years, showed the greatest irregularity of temperature after the twelfth day, it being anywhere from normal to

100° at any hour during the day or night, and in two hours would jump to between 104° and 105°. While this fever would rise and fall without influence, yet it was due partly to cold water enemas, as many of the sudden drops would follow these. The tongue was usually coated with a white fur with red tip and edges so characteristic of typhoid. In but two cases was it dry, brown, cracked and swollen, and these proved fatal.

The bowels were either regular or constipated in eighteen cases or 72 per cent. Of the seven cases showing diarrhœa in six it appeared early and in one late in the attack. A mild cathartic would frequently act inordinately when given to those who were constipated. Seven showed tympanites, four being of moderate severity, and these were all accompanied by diarrhœa. In one case there was hemorrhage from the bowel preceding death, but this girl had no tympanites and was constipated until the close of the attack.

The urines of only three of the twenty-five cases showed any albumen, and then with one exception but a trace, febrile albumenuria. The girl who had hemorrhage from the bowel showed a large amount of albumen with blood casts just before death. None other contained casts.

In my last eleven cases only did I make the Ehrlich diazo test. Six gave the color reaction, or 54 per cent. This percentage is of no value, however, as in all of the negative cases it was impossible to get a daily sample of the urine. In the positive cases I found this test of much assistance in making an early diagnosis.

The nervous manifestations consisted principally of insomnia, which was the rule. Two complained of partial deafness, one had difficulty of urination, one incontinence of urine, two retention of urine and one slow, difficult speech.

Complications. Pregnancy and phlebitis were the only complications met with. One woman aet. 31 fell ill a week before she gave birth to a full term child; the second, aet. 16, was pregnant two months and aborted on the fifth day of fever; the third was pregnant five months and miscarried on the tenth day of fever. The second case died on the twentieth day; the others recovered.

Three cases, or 12 per cent., developed phlebitis, a high proportion, as statistics place it at 1 per cent. The left leg was affected in all three. One developed eighteen days after the temperature reached normal; another thirteen days after the decline, while in the third it appeared on the sixth day of fever. The stiffness lasted in one case a year, and in the others several months.

The mortality was two, or 8 per cent.

In three years, 1898-1900, there were reported 100 cases of typhoid fever in Canon City and immediate vicinity among a population of 6,000. Of these eight died, a mortality of 8 per cent.

Thirty-six of these occurred outside of Canon City proper, among a population of 2,300.

The water used for both domestic and irrigating purposes inside and outside the city limits comes from the same source of supply, the Arkansas river. In the country or suburban district the water used for drinking is taken from the ditches and stored in cisterns. As these ditches are all several miles in length, all of them flowing past houses and stables their entire length, and the largest flowing through the heart of the city, one would naturally expect a greater proportion of cases of typhoid fever among the ranchmen than within the city, where the water is piped. This does not occur, as the proportion of cases to population is less in the country than in the city—thirty-six to thirty-nine.

Within the past five years several thousand acres of new land have been opened for irrigation within a radius of a few miles from the city. This has required miles of new ditches to be dug, reservoirs excavated, and much of the land has been tilled. Those engaged in this work have shown no special tendency to typhoid or any other fever. If so-called mountain fever is a distinct entity, and is in fact malarial fever modified by altitude and climatic conditions, as is claimed by some members of this society, surely we ought to see it in Canon City. But the only prevailing fever seen in this locality is identical in its symptoms and course with the twenty-five cases detailed above. Nor does it pursue a mild and harmless course, for the mortality here of 8 per cent. is but little lower than in the eastern states.

We are forced, therefore, to the conclusion that we have here in Colorado genuine typhoid or enteric fever which differs in no way from typhoid fever seen elsewhere. That the local climatic conditions have but a slight if any effect on the course, duration and termination of the disease; and to claim that we have here a febrile disease similar in its symptoms and course, but differing in its etiology and pathology from typhoid, is misleading and incorrect.

DISCUSSION.

Dr. Wilson: I am very much pleased with the care that has been taken in the preparation of this paper and regret that Dr. Little did not go into detail in regard to his cases. I would like to know what time the doctor gives quinine and in what size doses.

Dr. Little: In the one case that I mentioned I did not intend to give the idea that it was a malarial case. Dr. Miel claims that malaria does exist here, and in a paper speaks of the fever being intermittent and remittent. The case which I spoke of had an intermittent fever and I gave two-grain doses of quinine four time a day, the child getting about eight grains a day; but that did not affect the temperature in any way whatever. Dr. Miel speaks of seeing malaria at La Junta. The conditions there may be different from those at Canon City. We have so much tilling of the land—much of it virgin soil—that it seems to me that we would see it in Canon City if malaria existed here. I have seen two cases—one in a man from New Mexico, who said that malaria existed where he came from. The other was imported from Oklahoma. The farmers filter their water through charcoal and some of them are careful about keeping their cisterns clean, while some are careless and negligent.

Dr. Munn: Apropos to the discussion, although not apropos to the subject of the paper, I think that the existence or the non-existence of malaria in Canon City will depend on the existence or non-existence there of the particular variety of mosquito that communicates malaria. I believe that two towns having all other conditions identical, but differing in regard to stagnant pools of water in which the anopheles or culex types of mosquitoes breed, the different types of fever will be very well explained.

OCCIPITO-POSTERIOR POSITIONS.

BY T. E. TAYLOR, M. D., DENVER, COLO.

One of the most frequent causes of difficult labor is a posterior position of the occiput, and accordingly some are refusing to classify such cases as normal. Although the great majority require no interference, yet so frequent are such positions that the minority of difficult ones assume great importance.

As to the frequency of occipito-posterior positions, there is no agreement among authorities, some classifying almost all right positions as posterior, while others find almost as many cases where the occiput lies to the right and anterior as where it is posterior, the most probable explanation being that without an early and careful examination, the diagnosis is not made until forward rotation has already occurred. Of most practical importance is the number which either refuse to rotate, or rotate backward into the hollow of the sacrum, and how considerable this number is may be seen from the report of Dr. Coles in Jefferson Maternity of Philadelphia. Of 975 cases 925 were occipital presentations, of which we may suppose that approximately 200 were occipito-posterior; and of these thirty, or 15 per cent., rotated backward. Of these thirty cases only six were delivered without assistance, forceps being used twenty times. All the mothers recovered, though twelve suffered from a torn perineum, two of the children being lost. Such results certainly show that nature needs assistance, and direct our attention to the question how she can be most effectively aided.

It is, of course, a primary requisite that a clear diagnosis should be made, and often this is somewhat difficult, as the head is slow to engage in the brim, and dilatation also is delayed, while the capul succedaneum is unusually thick. Abdominal palpation usually furnishes quite as accurate information of the position of the fœtus as the internal examination, the extremities being felt upon the left side of the abdomen, and the body being indistinctly felt far back on the right side. Another valuable

guide is the anterior shoulder, which here will be felt in the right groin.

One of the most useful guides to wise treatment is found in a study of the conditions where the natural mechanism fails. Of the thirty cases of backward rotation of the occiput above referred to, no less than eleven were multiparae, with old lacerations of the perineum and pelvic floor, and the general experience points to this as one of the most common causes of failure of anterior rotation. Another frequent cause of failure is lack of proper flexion, so that the brow has already engaged in the brim before the occiput has advanced sufficiently to feel the impulse to forward rotation, and so such rotation cannot be accomplished. Our treatment, therefore, must be directed toward removing this hindrance to the favorable progress of the labor at as early a period as possible, while rectification is least difficult. This may be aided by pressure with the finger against the brow during pains. In many cases this simple procedure will restore flexion, when, if the perineum is normal, the case may be left to nature. If, however, flexion cannot be thus restored, more efficient means must be used without delay.

If we can secure forward rotation of the occiput, flexion will be produced by the ordinary mechanism, and so to this end we direct our efforts, as we must also in those cases where the perineum is so damaged that it is unlikely to direct the occiput forward. Such rotation may be sought by means of external manipulation, rotating the head by pressure upon it over the pubes as well as by rotating the body, the head being released from the brim by placing the patient in the knee-chest position for a time, and then upon the side to which the occiput is directed. When the membranes are intact, or even in many cases where the membranes have already ruptured, if only the head is movable above the brim, this method will usually succeed. If it does not, greater power must be exerted, and this can be done in favorable cases, especially where the perineum has been lacerated, by the thumb and finger in the vagina. Otherwise the hand must be passed into the vagina, under complete anæsthesia, and the head elevated and rotated. If the child's body can be made to follow the rotation of the head, the new position will be secure; but if

not, the head must be kept in place until the pains have caused it to engage, or forceps must be applied and the labor promptly terminated.

There remains to be considered the cases which are not seen at this early stage, or where the conditions were such as to promise a spontaneous successful termination, but where, for some reason, forward rotation has failed. These cases are much more serious, and whatever plan is adopted the results are likely to be more unsatisfactory. If forceps are applied and the head dragged down with the occiput posterior there must be great bruising of the maternal soft parts and a complete laceration of the perineum. If the forceps are used to rotate the head, the damage to the mother is likely to be even greater, while symphysiotomy, which has been suggested for this condition, seems scarcely necessary. The objections to each of these procedures are so weighty as to force us to seek a better plan.

Although the liquor amuii has long since escaped and the head been crowded down into the cavity of the pelvis, it is often possible to push it up above the brim, and to accomplish rotation. Profound anæsthesia will relax even the uterus to a very considerable degree, and the Trendelenburg position causes the fœtus to tend to gravitate away from the brim. Under these favorable circumstances, a moderate but steady pressure upon the head will usually soon dislodge it, and raise it above the brim, in which case flexion and rotation are usually possible. Even where at first the head seems immovable, a persistent pressure causes it to yield.

Podalic version is impossible or contra-indicated in these cases. It has been done at an early stage, before it was known whether any operation would be needed, but this seems unjustifiably "meddlesome."

For the impacted cases, craniotomy was formerly often resorted to, but it is now almost universally condemned unless the child is dead.

THE PHYSICIAN IN RELATION TO THE DISPENSING OF MEDICINE.

BY J. TRACY MELVIN, SAGUACHE, COLO.

From many and varied sources comes unmistakable evidence that a radical change is taking place in the feeling of the profession throughout the country regarding the dispensing of medicine direct to the patient by the physician. This is evidenced by the discussions in both medical and pharmaceutical journals, by the acknowledged marked diminution of prescription work in the leading pharmacies, both East and West, and in the greatly increased business reported by all the great manufacturing pharmacists who cater directly for the physicians' trade. Is this a step backward or forward? We have noted in our own country the evolution of the modern physician, with his smart little case, containing practically no medicine, from he of the capacious saddle-bags and ample attic supply of fifty years ago or more. We have seen at least one generation of doctors rise up who are as profoundly ignorant of the physical, chemical or botanic properties of the drugs which he uses in his battle with disease as it is possible for any educated man to be. We have seen students graduate from the foremost medical colleges, who, after four full years of most diligent study and research, knew of no way of differentiating potassium iodid from common salt, or epsom salts from oxalic acid, at the bedside. We have seen many older practitioners who did not know what the U. S. Pharmacopeia was, or its authority. And must we not, nearly all of us, admit that we receive even to-day a large part of our supposed therapeutic knowledge from the innumerable alleged medical journals which flood our mails and which are published solely in the interest of secret and proprietary remedies, often combined in "prescriptions" fearfully and wonderfully devised? Should we not hesitate, then, before changing to a system which will at least presuppose a confidence in the remedial effects of the drugs we use, a knowledge of their physiological action

and the ability and willingness to observe results closely and to judge fairly?

We recognize that in times past a dispensing physician has been a term of opprobrium no less severe than that of a prescribing druggist, but this should not prevent our willingness to study present conditions and future prospects along this line.

There are doubtless many men whose time is so fully occupied and who have at their command an educated and conscientious pharmacist, that they seldom would care to consider the question of their dispensing any medicines whatever except in some emergency, but the average practitioner, even in the city, I find is constantly using a more generous pocket-case and seldom cares to-day to write a prescription for a few tenth-grain calomel powders, or for a couple of Dover powders. It is vastly easier to hand them out from his pocket-case in the form of tablets.

But to those of us who practice in smaller towns or in the country, where perhaps we must rely upon the ordinary druggist of uncertain attainments, of limited experience and of doubtful stock, this becomes a more vital and important question than many others upon which we devote much time at our annual meetings and in our journals.

Can we be more certain in the results, more accurate in our dosage, more satisfactory to patients and their friends, by dispensing our remedies ourselves at the bedside, than by sending our prescriptions to the pharmacist, if there be one? If all these points can be answered in the affirmative, our duty is plain and discussion useless, except as to ways and means. It is true that in many of the country districts we have been compelled by our environment to adopt this plan, whether it is really best or not, because of the long distance from any other source of supplies; but the question is, should the practice be more general and from choice, not necessity.

First, as to certainty in results. I do not belong to the school of therapeutic nihilists myself. I do not believe that six weeks in bed is the only efficient treatment for rheumatism, or that four weeks in bed with cold baths and proper diet is even a rational *complete* treatment for typhoid fever, notwithstanding its advocacy by honored clinical teachers. Still, as I have stated in a previous paper presented to this society, I do believe that

most of the galenical preparations of even our best pharmacists are uncertain and unreliable from their very nature and because of the necessary constant variation in their real medicinal content. The remedies dispensed by the modern physician are not so, being as a rule definite, permanent alkaloids or active principles, accurately divided in definite doses by the granule or tablet form in which they are used, and expressly prepared for this purpose, makes the medication as certain as possible in its results; while its form, which may be modified as pill, powder or solution, one remedy or several combined, gives unrivalled opportunity to adapt the remedy to the particular case in hand.

Second, is it more satisfactory to the patient and friends? That must be a matter of personal observation in each community. My own experience is very strong that it is. We all recognize the value of the personality of a physician in inspiring confidence in his patient, and where the patient observes this physician in whom he has such confidence selecting and preparing his medicine right there at the time of his visit, his confidence in a favorable results is immensely increased and no chance is left for those lurking suspicions so natural at such a time, that maybe the druggist did not prepare it properly. It is true that under such circumstances, if the results are not what the physician would wish, he cannot lay the blame on the druggist. I cannot too strongly urge this point of the increased satisfaction which medicines dispensed by the doctor give both patient and friends. Another great advantage is the opportunity for making such changes as the progress of your case may demand without attracting notice. We may leave medicine in the morning and find by evening that conditions are quite different from what we supposed or expected. A new prescription, the discarding of the previous medicine, all attract attention and comment, while the dispensing physician may modify, renew or discard, with none but himself to consult.

Another important point is the ease with which we may obtain our results by this method. I suppose that there are few of us to-day who do not recognize the general rule of giving any medicine which may be indicated, by itself if possible, until its definite therapeutic or even physiological effect has been obtained. This means an extremely variable dose, which can seldom be pro-

vided for as the case progresses, unless you are dispensing the medicine yourself; but never, under any circumstances, where you are drawing your supplies from galenical preparations of varying strengths, differing ages, unknown origin and from competing pharmacists.

If, then, we conclude that this system is better, safer and more satisfactory to the patient, is it practical, is it wise, is it desirable for the physician?

I have already intimated several ways in which it is of advantage to him, and I might mention another point of no little importance to those of us who depend solely upon family practice, and that is, that in this way we retain a large amount of minor work which otherwise would not come to our office at all. There are very many cases of slight fevers, indigestions, headaches, coughs and bowel troubles which are commonly treated in the family, by advice of friends or of the druggist, which under this system come to be placed more and more under the care of the family doctor. Not always do these cases mean a straight office fee, but at least they mean something, besides giving one a closer hold upon the family. On the other hand, the question arises, is such a plan practical for the average practitioner? Does it not involve too much expense without return? Are not there chances for serious mistakes? In a word, does it not add to the burdens of the physician, rather than lighten? I have not found that any of these objections hold good. Almost the only reason why our predecessors so largely abandoned dispensing and began prescribing was because of the skilled labor and complicated process necessary to extract the medicinal activity from plants, the bulky and inconvenient form in which nearly all medicine existed and the liability to mistakes and errors in guessing at the different doses by the bedside. Now all of this has been wholly changed. Granules and tablet triturates enable one to carry in a two drachm vial the active principle in convenient, accurately divided doses the equivalent of one quart of syrup of ipecac, and proportionally of other remedies. In fact, a thin pocket-case will to-day hold more real medicine than the largest buggy-case of twenty years ago. For we must recognize that pharmacy has changed during the past thirty years no less radically than medicine and surgery. No longer does the drug-

gist gather his herbs himself or buy them of those who do. Seldom does he even make his own preparations from them, and never does he pretend to extract the active principles or to manufacture his chemical salts. No, progress in this line, as in all others, has been toward eliminating all of these operations on a small scale and confining them to those great manufacturing houses, where unlimited capital provides the highest skill, the most perfect apparatus, the most extensive gathering of their supplies and their most rigid testing, chemically and physiologically. Now, if the average druggist has become by the force of these conditions merely the merchant, whose business is the buying and selling of certain articles, and such is the case in more than nine-tenths of our pharmacies, why should we still possess the delusion that he is a necessary professional partner?

It is objected that when once a physician limits himself to those remedies which he himself carries, he gets into ruts and makes a limited assortment answer when perhaps he would make a wider selection more accurately fitted for the case in hand were he prescribing from a well supplied drug store. Theoretically this appears to be true, yet it is almost humiliating to find within what narrow therapeutic lines our most prominent men confine themselves . There are to-day in our pharmacopia more than 900 official remedies, and we know that very many of those most used are not yet official, yet in one of the largest hospitals in this country, with their staff of over 100 physicians, I found their dispensary to contain less than 100 remedies and almost three-fourths of their 300 daily prescriptions were prepared from twenty-five of these. My experience of many years behind the prescription counter in this and other cities proved to me again and again that ninety out of every hundred consecutive prescriptions by any one man could be prepared with a list of thirty-five remedies. Of course, a larger number, taken consecutively, would show a wider variation, owing to the changing seasons and the trial of newly recommended drugs. So I would submit that an average practitioner can readily select, say, fifty remedies or combinations which will include all that he will under any circumstances use in nine-tenths of his work, and with them he will form combinations more efficient and more acceptable in every way to the patient than the prescriptions he writes, for in this way he will learn how

atrocious some of the recommended formulæ in our standard text-books are to sight and taste, especially if he tries to administer them to children. These fifty selected remedies would not occupy six feet of narrow shelf room and half of them would be needed in the pocket-case. Now, one's location and surroundings and his own experience would say to what extent this stock should be increased. In my own case, although I have for years owned the only drug store in our community, I have found it far more satisfactory in every way to attach a complete dispensary to my office, and provide it with every convenience for easy and accurate work; so I find that I have over 600 remedies and preparations on my shelves; yet, of my last 1,000 prescriptions—for I keep as accurate a record of all medicines dispensed as though the prescription was to pass through another's hands—920 were drawn from a group of forty remedies, of which twenty-two were alkaloids, five synthetics and thirteen chemical salts.

In conclusion, I would only enter a plea for a thoughtful recognition of the changed conditions of to-day and for a return to that accurate, well-trained clinical observation of the actual effects of every remedy administered by the physician in each case that he treats, to the end that the vast mass of therapeutic trash which now confuses and misleads us may be wholly swept away, and that the physicians of the present and future may be so trained and educated as to give to this most important branch of our profession that same skilled attention, born of scientific laboratory methods, which they now give to differential bacteriological diagnosis or to blood examinations.

This will only be when our colleges and the profession at large will have turned from the traditions and customs of the past and brought themselves into the closest possible contact with the nature and peculiarities of the weapons which they are using.

DISCUSSION.

Dr. Whitney: I do not wish to discuss this paper, but I want to compliment Dr. Melvin upon it, and to say that I believe it to contain a great many valuable points which are worthy of our most thoughtful consideration.

Dr. Wilson: I congratulate Dr. Melvin on the excellence of his paper. I feel much as he does in the matter. For pain

relieving and life saving in emergencies, it is the duty of a physician to have suitable remedies with him. It is convenient and profitable in many other cases where polypharmacy is not to be practiced, to have with you your alkaloids and triturates and other remedies in come concentrated form from almost every important subdivision of the materia madica, so that you can generally have some suitable remedy for any ordinary case you may see. If you find a case for which you have no suitable remedy after exercising your best judgment in selecting remedies suitable for the season and using your diligence in keeping your vials constantly filled with remedies you are most likely to need, then you can give a prescription. I feel kindly towards the druggists, but in these matters I do not consult their interests, as they do not consult mine when they prescribe over their counters, recommend patent medicines and advertise numerous proprietary remedies for the cure of disease of which they know nothing. A prescription, though wisely given, is not always that harmless missile which it would seem to be. A case of argyria from prolonged use of nitrate of silver, used on a prescription, came under my observation here in Denver. The prescription had been given her in another state, she taking a copy of it, came to Denver and continued its use. The silver was given for ulcer of the stomach, which it failed to cure, and being used too long caused the discoloration of the skin, which lasted her to her grave. I well remember a lady in this city pluming herself on her beneficence in having loaned her prescription, which she obtained from one of our physicians, to a number of other ladies, who used it, she claims, with happy results, not knowing perhaps whether they were treating themselves for a corn on the toe or galloping consumption.

Dr. Blaine: In this discussion some one has referred to the habit of druggists refilling and copying, ad lib. When I came to this city I soon discovered that patients were in the habit of peddling my prescriptions from house to house, and often a party whom I had never seen would call at a drug store with a bottle or box with my name on label and ask to have it refilled.

I overcame this annoyance by having printed on the prescription: "This prescription is the property of the undersigned

and must not be copied or refilled without orders." I have had very little difficulty in having these instructions obeyed, and I agree with Dr. McHugh that there are plenty of honest druggists in every place who are only too glad to carry out our wishes in this matter.

Dr. Tyler: I think the handwriting of physicians often offers sufficient excuse for druggists' mistakes.

Dr. Miel: In the matter under discussion, the physician and the druggist are both at fault. Their interests are largely common and the work of each is sufficient, yet they too often improvise. Existing differences should be harmonized and a more cordial relation fostered. To this end the State Medical Association and the Pharmaceutical Association should each year appoint a committee for joint conference upon questions common to both, and for the better interests of the community.

Dr. Stuver: I have had long experience as the owner of a drug store, while at the same time being engaged in general medical practice, and I want to say right here that I believe that the physician ought to prescribe most of his own medicine. Now we all see in our medical journals many complaints and lamentations in regard to the neglect of materia medica. I do not know anything more important than an accurate knowledge of what you are giving. My experience with pharmacists in the last twenty years has been that where you would get one skilled pharmacist to do your work, and do it so that you could with any degree of accuracy predict results, you would find many so addicted to the use of whisky, morphine or some other demoralizing habit that they could not be relied upon and were liable to make mistakes. I do not refer to the large towns and cities, but I do believe that in the country districts and in the small towns where thoroughly reliable pharmacists are rare that the physician should be in a position to dispense a large part of his own medicine. I believe that he should study materia medica accurately and thoroughly enough so that he can fill prescriptions without any difficulty; also that he should know what brands of drugs and medicines are of standard strength and purity. If he does not know the character of the tools he is using the sooner

he corrects this fundamental defect in his medical education the better it will be for his patients.

Dr. Melvin: I am very glad to find such general interest taken in the discussion of this very vital question and to notice that even our city confreres have found themselves face to face with this question. However, I do not wish to be understood as throwing down the gauntlet to our pharmaceutical friends, by representing that we are compelled to take such action on account of the antagonism or ignorance of some members of their profession. By no means. No one has more cause than I to recognize the spirit of earnest conscientious effort to do the very best and most scientific work possible, and to purge their profession of unworthy or incompetent members at every opportunity, and as a rule to aid our profession in every way possible in our battle with disease. But I do insist that as progress is being made and conditions have so greatly changed, that our methods must change too, if we would avail ourselves of the very best means which are to-day available in our work. One more point which I wish to emphasize is that we have no right to pretend to dispense our medicines unless we are first willing to spend the time and effort in learning to do it intelligently, and the money to provide the proper facilities to do it right. One must properly equip himself for this advanced work just as completely as he would in taking up modern microscopic examinations. No physician has the right in these days to do this work with a dispensary which "looks like a stall in a rummage sale," to quote from a recent editorial of Frank Norbury's upon this subject.

EXTENSIVE GUNSHOT INJURY TO THE BRAIN.

REPORTED BY EDMUND J. A. ROGERS, M. D.

On June 16, 1898, about 3 p. m., Sergeant J. B., aged 18, in camp with the E. D. H. S. Cadets at Lyons, Colo., went with a companion into the woods to shoot; with an old muzzle-loading musket.

When about a mile and a half from camp, and while J. B. was sighting along the barrel and firing at a bird, the gun exploded and a large, bleeding wound was inflicted just over the right eye in the frontal region. The boy was only slightly stunned and sat down just where he stood; he then almost immediately tried to reach a stream of water which was near. His companion ran for help, and, discovering a passing wagon, hailed it, and with the assistance of the driver the wounded boy got into the wagon and was driven to camp.

Drs. Smith and Walker, through whose courtesy I was called into the case, were at the camp in medical charge, and at once came to his assistance. They found an extensive lacerated wound over the right forehead with a large area of the bone torn away. From the wound disintegrated brain substance was escaping, with some blood. They very wisely did not explore the wound, but carefully cleansed the margins and surrounding surface and applied a soft dressing.

In the meantime telegrams had reached Denver, and I, accompanying the father and family physician, had started for the scene on a special train. The boy showed some signs of shock and weakness, and had gradually grown less conscious, but recognized his father on his arrival and answered questions in monosyllables.

I deemed it wise to get to hospital before disturbing the wound, and he was therefore carried at once on his cot onto the train and we returned the fifty-two miles to Denver at remarkable speed.

His condition meantime demanded strong stimulation, as he gradually sank into complete unconsciousness. Reaching St.

Luke's Hospital, we were joined by Drs. Eskridge and Pershing, and several surgeons were also present as we examined the wound, between 7 and 8 p. m.

Chloroform was administered; on removing the bandages I found the wound as already described. The great impact seemed to have been against the inner portion of the supra-orbital arch, with a direction backwards, upwards and outwards. as was confirmed by the position at the time of injury; the inner two-thirds of this arch was destroyed, and a large space left without bone, the roof of the orbit comminuted and much of it gone and lines of fracture extended upwards and backwards over the parietal and outward over the temporal regions.

The surface was cleansed and the external wound enlarged by a curved incision upwards and backwards. The bones were then examined and trimmed and the interior of the skull explored with my fingers.

Here I found a great mass of disintegrated material, blood-clots, disorganized brain tissue, pieces of bone and some scraps of wood. I slowly cleansed this away from in front, to find the extent of the area very great. Clearing backwards, I came upon the breech pin of the rifle deeply imbedded in the brain, having apparently struck the inner wall of the skull and rebounded into the brain, churning it up into an unrecognizable mass of tissue.

This breech pin, which was then removed, is altogether two and three-fourths inches long, while the perpendicular part which supports the screw is one inch long, and it weighs about 800 grains.

All of the broken up tissue was carefully removed by the fingers and by irrigation, great care being exercised not to disturb tissue that seemed in place.

When this was done the cavity extended back well into the tempero-sphenoidal lobe, and the fingers could be easily laid on the exposed superior border of the petrous portion of the temporal bone.

A rough estimate made at the time was that two-thirds of the frontal and one-third of the tempero-sphenoidal lobes had been destroyed.

No time was taken for careful measurement or examination,

as the condition of the patient was bad and growing worse, and the future looked hopeless. The cavity was, however, gently packed and well drained, and the patient put to bed and well stimulated; strychnine and spartein being freely used. He rallied during the night and next day had improved, but during the second evening again almost completely collapsed, coma becoming profound, and the heart very rapid and weak.

Again under forced stimulation he rallied slowly, and did not again show serious signs of constitutional failure.

The cavity soon suppurated very freely, but was kept as clean as possible and freely drained. The right eye was at first sightless but slowly improved. (It, however, still continues defective.)

There was a tendency in the wound to close too rapidly, but the shutting off of any undrained area was at once indicated by the temperature and relieved by ventilation.

The intercranial cavity was obliterated with marvelous rapidity. In a few days the patient was convalescent, but it seemed almost impossible to hope that he could again come to his normal mental and physical condition; but this he did by gradual improvement.

Apart from the direct local effects of the violence no change was at any time manifest, nor has any developed since.

He remained in hospital for only twenty-seven days, but was watched and dressed with the greatest care for two months afterwards.

His improvement was progressive, and in a few months he considered himself as well as ever, and gradually resumed his usual life. He led a vigorous out-door life last year, but in the fall of 1900 took to office work, which he is still doing, without apparently the impairment of a single faculty except the defect in sight of the right eye.

I here append the notes made by Dr. Eskridge of his examination of his nervous condition at the present time. A case remarkably similar to this was reported by Dr. G. A. Stockwell of Port Huron, Mich., in a paper published in the Therapeutical Gazette, 1889, Vol. 13, page 329.

Examination made by Dr. Eskridge, June, 1901:

J. A. B.—Exceedingly well developed, weight 170 pounds, muscular and exceedingly strong.

Dyn. R. 234; L. 200.

All leg muscles are strong.

There is no wasting of the muscles of any portion of the body.

There is no ataxia or awkwardness of gait. In fact, barring the depression on the right and anterior portion of the skull, he is a beautiful specimen of a well developed man.

There is no disturbance of any of the general sensations, such as touch, steriognosis, temperature (cold or heat), pain, pressure, muscular or localization.

The special senses present some interesting conditions. Right eye, vision 6/50. With exceptions noted, fields apparently normal. Ophthalmoscope with 2 D. showed the optic disk and surrounding retina apparently nearly normal, except at some portions the vessels are apparently tortuous. The perepheral fields seemed to be nearly normal, but there are dark spots in the center fields. Left eye, vision 6/4, fields, musculature, disks and fundi apparently normal.

Hearing normal.

Taste, right, sweet tasted bitter and the sensation was delayed very much. Bitters on this side are tasted as bitters, but greatly delayed. Left normal to bitters and sweets.

Smell on the right side very much delayed and less acute than on the left. On the left side smell is normal.

DISCUSSION.

Dr. Munn: In the Pittsburg Medical Review, in 1887 or 1888, will be found the history of a case which is almost identical with the one presented by Dr. Rogers. I think it is by Dr. Gaddis, of Uniontown, Pa. The case when first examined failed to reveal the presence of the breech block; but some time afterward an abscess formed and discharged, and on exploring this abscess cavity the presence of the breech block was discovered and it was removed.

THE TREATMENT OF TYPHOID FEVER, WITH SPECIAL REFERENCE TO THE INTRA-RECTAL INJECTION OF NORMAL SALT SOLUTION.

BY E. STUVER, M. SC., M. D., PH. D., FORT COLLINS, COLO.

Typhoid fever is an acute infectious disease, caused by the Koch-Eberth bacillus. It gains access to the body by means of infected drinking water, milk, vegetables, etc. It may be conveyed by flies, by actual contact with those affected by the disease, and, in rare instances, gains entrance into the body by means of dust.

For a long time it has been known that the feces is the principal medium by which the poison is conveyed to streams and other sources of water supply, but during the last few years it has likewise been demonstrated that the urine contains the bacilli in enormous numbers in a large percentage of cases, and that unless thoroughly sterilized, is a source of great danger. Indeed, as recently pointed out, the typhoid bacilli remain much longer in the bladder, and, therefore, in the urine, than in the intestines and feces. In Gwyn's case they were found in the urine voided five years after the attack of typhoid.

In order to carry out a rational, successful treatment of typhoid fever, I believe it is necessary to have a clear conception of the causative factors at work, and the parts, or organs, of the body affected by the disease.

I believe it is generally conceded at the present time that the specific pathological lesions and the general systemic manifestations of the disease, as well as the complications arising during its course, or following it as sequelæ, are not caused by the bacilli themselves, but result from the action of the toxins generated or produced by these bacilli.

Since these toxins are promptly taken up by the blood current, and carried to every organ, tissue and cell of the body, poisoning the brain, and causing mental perversions, delirium, and other nervous derangements, poisoning the heart, and pro-

ducing muscular weakness, degeneration and failure, poisoning every cell of the body, thereby lowering vital resistance, and deranging all the secretory and excretory functions, it follows that any treatment to be rational and successful must strike at the cause of the trouble. There are two guiding principles which should never be lost sight of in the treatment of any disease and which apply with peculiar force to typhoid fever.

1st.—Inhibit or destroy the pathogenic micro-organisms, and neutralize or eliminate their poisonous toxins.

2nd.—Strengthen the phagocytes and cells of the body, and conserve the bodily forces in their battle against the morbific agencies.

Let us now apply these fundamental principles to the treatment of typhoid fever.

In the first place the patient should be put to bed at the earliest possible moment, and kept quiet, both physically and mentally.

The hygienic surroundings should be the very best that can be secured.

The patient should be put in a large, cheerful, well-ventilated room; he should have two beds, one for day and one for night, and during the intervals of occupation the bedding should be thoroughly aired; the gowns and clothing should be changed every day, and oftener if there be excessive sweating.

In carrying out our first principle in our battle against the micro-organisms and their toxins, I believe an eliminative and antiseptic treatment occupies a very prominent place.

During the first few days I give, hourly, tablets containing one-half grain each of calomel and sodium-bicarbonate until free catharsis is produced. The calomel acts on the liver, producing a free flow of bile, and has a cathartic effect, and, as shown by Jendrassick several years ago, has also a decided diuretic effect.

By these different actions a large amount of toxic material and some of the disease-producing germs are carried out of the system. Furthermore, calomel is a powerful antiseptic, and not only inhibits the activity of the toxin-producing bacilli, but also arouses and strengthens the lethargic phagocytes and cells in their battle against the disease germs.

Coincidently with, or following the initial doses of calomel,

I give regularly some mild intestinal antiseptic. The Woodbridge tablet, No. 1, when not disagreeing with the stomach, given every hour for a week or so gives good results. (Each contains Podophyllin, gr. 1-960; Mercurous chloride, gr. 1-16; Guaiacol Carb., gr. 1-16; Menthol, gr. 1-16; Eucalyptol, q. s.)

The following combination of carbolic acid and Tr. Iodine, viz.: R.—Tr. Iodi., m. x; Ac. Carbolic, m. x; Aquæ Destillatæ Syrupi Simplicisaa q. s. ad. oz IV. M. Sig. Teaspoonful, in a little cold water every two hours,—has acted well in my hands, and mitigates the severity of the disease. Arsenite of copper, in 1-400 to 1-600 grain doses, every two hours does well in many cases.

Many writers assert that the good effects claimed for the antiseptic treatment is a figment of the imagination, and that sufficient antiseptic material to kill the bacilli would be fatal to the patient; that before we see the patient the bacilli have already penetrated deep into the bowels, and are beyond the reach of antiseptics and flushings.

These eminent theorists are supported by the medical nihilists, who, with an assumption of great wisdom, sneer at the use of medicines, and very pompously inform the poor, deluded physician who labors under the delusion that his principal function is to relieve suffering and to cut short or remove disease, that typhoid fever, being a self-limited disease, pursues an unalterable course, no more to be changed than the laws of the Medes and Persians, and any attempt to abort it or cut it short is a sacrilegious flying in the face of nature.

With all due respect for the great pathologists of the country, with whom the post-mortem is often the most important part of a case, and for the medical nihilists who can see no virtue in therapeutic agents, we must differ.

With hundreds of honest, painstaking and conscientious physicians all over our country, we believe the course of the disease can be shortened, the severity of its symptoms mitigated, and many of its complications prevented. If it is good treatment and hastens the healing process to drain and cleanse a wound on the surface of the body, why is it not good treatment to resort to similar measures in treating the infected, congested, inflamed, or ulcerated bowel?

The alimentary canal during the early stages of typhoid fever can appropriately be compared to a foul stream, and calomel, or other eliminative medicines, have much the same effect on it as a freshet has on a foul stream. They wash out the feces, decomposing materials, bacilli, toxins, etc., and clean the canal from one end to the other. This lessens the number of bacilli, and decreases the quantity of accumulated toxins, places the bowels, if not in a surgically clean, at least in a vastly improved condition, and removes an incubus from the whole system.

The toxin-poisoned cells arouse from their lethargic state, the headache disappears, and the countenance assumes a brighter and more cheerful aspect.

Where the bowels act too freely, which, in passing, I desire to remark occurs in only from 10 to 15 per cent. of the cases in the Rocky Mountain region, I have obtained very good results from five-grain tablets composed of equal parts of sulphocarbolates of zinc, lime and soda (adult dose). As soon as cardiac weakness makes its appearance I begin the regular administration of Da Costa's heart tonic tablets, one tablet every six hours. Each of these tablets contains: Nitroglycerine, gr. 1-100; Tr. Digitalis, m ii; Tr. Strophanchus, m ii; Tr. Belladonna m ¼.

These tablets have a mild tonic and stimulant effect on the heart; they maintain arterial tension, and at the same time dilate the capillaries of the surface of the body, thereby preventing internal congestions; in short, they maintain the normal equilibrium of the circulation.

The fever has always been a veritable *bete noir* to the great majority of physicians in the treatment of typhoid fever. It has been generally believed that it leads to fatty degeneration of the heart, and that if a very high temperature be allowed to continue for any considerable length of time, the tissues and vital organs of the body will suffer serious injury. This belief and solicitude has led to all sorts of means, wise and unwise, to reduce the temperature within what are regarded as safe limits. It has generally been thought that whenever it exceeds 102°, or 102½° F., active measures should be adopted to reduce it.

Several years ago the coal tar derivatives were extensively used, and enormous quantities of acetanilid, antipyrine, and simi-

lar preparations were given to reduce the fever. Happily, at the present time, safer and more rational views more generally obtain, and these dangerous remedies, as well as opiates, sedatives and alcohol in all its varied forms are being relegated to a well merited oblivion.

When we consider the well established pernicious effects of alcohol, how its paralyzing influence reaches every organ, tissue and cell of the body; how, by clogging the dialyzing membranes, it interferes with normal osmotic processes, and thereby retards both the assimilation of nutrient materials, and the elimination of poisons; poisons which result from the ordinary retrograde metabolism of the body, and those which are generated by the specific bacilli, we wonder how it ever came to be so extensively used by the medical profession. My experience with, and observations of the use of alcohol in any of its forms, in the treatment of typhoid fever, have convinced me that it is a very harmful agent. I have never seen any good results from its use, and in the few cases in which I have used it, it has always done harm. It irritates the heart, produces delirium, lessens excretion, and has a general bad effect.

Whether our high altitude and highly ozonized atmosphere have anything to do with the production of these results, I cannot say positively, but I am inclined to think that they do. Furthermore, I believe that in the treatment of any disease alcohol must be more carefully and sparingly used than in lower altitudes, and damper climates.

The cold bath is one of the approved methods of treatment, and has many earnest advocates, so earnest, I have often thought, that they fail to see the good in other methods of treatment. There is no question as to the good effects of the cold bath, and I have used it with excellent results in a number of cases. It lowers the temperature from one to four degrees, tones up the nervous system, strengthens the heart, and largely increases the amount of urine and toxic materials eliminated by the kidneys, but while these beneficent results follow the use of the cold bath, it is claimed on the other hand that the application of cold to the surface of the body considerably increases the tendency to intestinal hemorrhages as well as the fatality following that accident.

Dr. Roland G. Curtin, of Philadelphia (*Journal American Medical Association*, Sept. 25, 1897), after a careful analysis of sixty hemorrhagic cases, as furnished by the hospital records, writes as follows: "When you take into consideration that the application of cold drives the blood from the surface of the body, it must necessarily be followed by an increased amount in the intestines, causing a congested condition of the internal organs, and if there happens to be a blood vessel weakened or opened by the operative process, it may give way, or a clot be dislodged, and a hemorrhage follow. The necessary disturbance in giving a cold bath, or the reaction following it may have a tendency to produce the same result. The statistics would seem to indicate that it would be well to avoid cold applications to the skin when there is a tendency to hemorrhage, or when it has already occurred. I would also suggest that, during the third week, when the sloughing process is most active, the cold bath, or pack, if used at all, be used with great care, avoiding sudden and marked impressions on the external circulation; we may in this way avoid making the case a hemorrhagic one."

Then, too, the almost insuperable difficulty of giving these cold baths in private practice is a serious objection to the treatment.

Many ingenious devices have been suggested for overcoming the difficulty, but when tried in the crucible of experience are found to be unsatisfactory. Fortunately, however, I believe we have within our reach a method which is always available and easy of application, and while possessing the advantages of the cold bath, is free from its inconvenience and dangers. I refer to the *intra-rectal injection of cold normal salt solution.*

I have seen the use of cold water per rectum advocated, but so far as I know the use of the normal salt solution for this purpose is a thought original with myself. By these injections, by using either a bed pan, or a Kelly pad to protect the bed, one avoids disturbing the patient or causing movement on his part. By means of a fountain syringe hung up at the head of the bed these injections can be given without fuss, muss, or trouble of any kind. The first one will probably come away, bringing with it some feces, thereby cleansing the bowel; subsequent ones may come away after a time, but if they do, they abstract a large

amount of heat; often, however, they are retained, and the water passes out through the skin and kidneys, principally the latter, for Dr. W. H. Thompson has ascertained that normal salt solutions causes a marked increase in the amount of urine, and of the urea contained in it. (*Journal American Medical Association,* Aug. 26, 1899).

The cold normal salt solution (and I advise very cold, even ice water, when the fever is high) reduces the temperature, calms nervous irritability, and tones up the nervous system, strengthens the heart, eliminates toxins from the system and prevents instead of causing internal congestion. I have used them in a number of cases, with very beneficial results, and in a recent very severe case, with tymphanitic distension and tenderness of the abdomen, headache, temperature 104° F., dicrotic pulse, sordes on the teeth, in short, a case of profound toxemia, the relief was almost instantaneous. The patient's temperature declined, the pulse became more regular and stronger, and the countenance assumed a look of peace and contentment instead of the former pained expression."[2]

Since the above was written our town of Fort Collins, Colorado, has passed through a severe epidemic of typhoid fever, there being about three hundred cases, or 10 per cent. of the whole population. In a large number the disease was attended by the ordinary complications, and intestinal hemorrhages, in particular, were very frequent, and resulted fatally in several cases. Long continued and severe delirium occurred frequently in the hands of our most prominent physicians; marked abdominal distension was often present, and the characteristic lenticular rose spots, sordes on the teeth, and bleeding of the gums occurred in quite a large percentage of the cases. As nearly as I can ascertain there were about forty deaths. Just prior to, and during this epidemic, I treated thirty-six cases ranging in age from 17 months to 56 years, by means of the intra-rectal normal salt solution injections, with *one death.*

The treatment was always initiated by the administration of calomel as above indicated, and by washing out the bowels with one, two or more large enemata of warm water containing a little soap. This removes all feces and irritating materials from the lower bowel, and puts it in the best possible condition to absorb the salt solution.

When the fever was low, that is, not to exceed 102° F., 2 ozs. to one pint, according to the age and retaining capacity, was injected into the bowel every three or four hours, during the interval between 6 a. m. to 10 p. m., when it rose from 102° to 103½°. or 104° F., the injections were given every two hours, and when the fever became very high, 104° to 105°, or over, the injections were often given every hour. An examination of the records of my cases shows that in six or eight the fever ran high, ranging from 104½° to 105 3-5° for six or eight days continuously. Some of these cases sweat profusely, and the kidneys acted freely in all during the height of the fever; several of them had abundant sordes on the teeth, bleeding of the gums, and the rose spots, but in none of these high temperature cases, nor in any others, except the ones to which I shall specially refer, was there delirium, or abdominal tympanites, and in only a few, slight abdominal soreness. The patients would sleep the whole night as peacefully as healthy babies, even when the temperature registered 105 3-5° at 5 p. m. and 104½° the following morning.

I did not give probably over twenty doses of quieting medicine to the whole thirty-six cases during the entire course of the disease, and these were given to a few nervous, restless patients. One patient, with chronic heart disease, a man about 34, who had not been feeling well for a couple of months, and who was very much worried and run down by helping to take care of his little boy (an only child) through a severe attack of the fever, followed by pneumonia, had one hemorrhage, and finally died from heart failure about a week afterwards. I have thought if he had gone to bed promptly on the inception of the symptoms the result might have been different. This, however, he would not do. He tried to fight the disease off from December 15th to December 26th, and thereby, I believe, lost his chance of recovery. One child, 5 years old, I did not see until fifteen days after he was taken sick. In this case there was marked tympanites, abdominal tenderness, high fever and some delirium, but these symptoms promptly subsided under the salt water injections, and he made a good recovery. Cold sponging at intervals of two to four hours was used in nearly all the cases, and had a very soothing and beneficial effect.

During the early part of the epidemic, cool baths were used in a few cases, but I could not see that they were of benefit in any case, and as they caused shock and faintness in a number, they were discontinued.

Warm baths (85° to 90°) were used with decidedly beneficial results in a number of cases; they often produced a more decided lowering of the temperature than the cold baths, and were not attended by any of the unpleasant effects of the latter. In this respect my experience coincides with that of Dr. T. S. Dabney[5], who writes as follows: "Plunging a patient into cold water is as irrational as throwing him into the fire. * * * The temperature of the water should never be below 65°, and 85° F. is preferable. Water at 85° will reduce the temperature more rapidly than at 65°."

In addition to the rectal flushings the patient should be given, at regular intervals, large quantities of cold water to drink. This nourishes and keeps the fever-parched cells in good working condition and eliminates large quantities of toxins from the body.

I believe that, heretofore, too much danger has been attributed to high fever, per se, and I am inclined to think that the fever is largely a symptom, or index, of the intensity of the battle going on between the invading bacilli and the phagocytes and cells of the body which are striving to repel their attacks on the system. If this be true the pathological lesions and degenerations peculiar to the disease are not caused by the fever, but are produced by the toxins generated by the bacilli.

This being the case, our proper function in the treatment of this dread disease is not to confine our principal efforts to the reduction of symptomatic fever, but to the elimination of the toxins which cause the intestinal ulceration, the delirium, and the general toxæmia and the various lesions and symptoms of the disease. If we are successful in accomplishing this object the disease will run a comparatively mild course in the great majority of cases; delirium, tympanites and intestinal hemorrhage will be rare complications, and our patients will be convalescent in a much shorter time than if we treat them by antipyretics, narcotics, and alcoholic liquors. When we remember that alcohol is not a true stimulant, but really a narcotic, and while obtunding

sensibility, clogs up the dialyzing membranes surrounding the cells of the body, thereby retarding the eliminative functions, and favoring the retention of toxic materials in the system, we can understand how it does harm, and cannot do any good in the treatment of this disease.

In cases during the latter stage of the disease where there were indications of heart failure, I have used strychnine in 1-30 gr. doses, every six hours, alternating with Da Costa's heart tonic tablets, with excellent effect. The physician should watch the pulse carefully, and when it becomes tense and irritable, the strychnine should be suspended for the time being until this condition subsides.

The diet is a matter of the very greatest importance, but unfortunately, physicians hold widely divergent views as to what is best to give.

I believe it should be almost entirely liquid until the fever has subsided. In harmony with the best recent authorities on the subject, I believe the best interests of the patient are subserved by a more generous and liberal diet than was formerly advised, and I certainly am strongly opposed to a starvation diet. As the proteids furnish an excellent culture medium for the bacilli, I believe meats and meat broths, meat juices, etc., are not the proper diet for a typhoid fever patient. When good, fresh buttermilk can be obtained I prefer it to almost anything else. Sweet milk, cream and all, is our main reliance in most cases, but in some instances it forms such hard masses in the bowels that it becomes a source of real danger, and in others it becomes so repugnant to the patient that it is absolutely refused. The addition of lime water will often make it more palatable, and help to prevent the formation of these hard, caseous masses.

In addition to buttermilk and milk, whey, soft boiled eggs, toast water, barley water, and fruit juices have constituted my main diet list during the febrile stage. These should be given only in such quantities as can be thoroughly digested and assimilated during the first two or three weeks. Albuminated water, made by stirring the white of one raw fresh egg in a glass of cold water, can be given by the glassful.

Care should be taken during the convalescent stage to avoid dietetic excesses or imprudences in order to give the weakened

digestive organs a chance to regain their normal tone, and to guard against the evils that overindulgence might produce.

REFERENCES.

1. Journal American Medical Association, March 9, 1901, p. 669.
2. Mountain Fever, by E. Stuver, M. D., Medical News, November 4, 1899.
3. New Albany Medical Herald, July, 1900.

NOTE. The salt solution I recently used was made according to the formula of Prof. H. A. Hare, viz.:

Calcii Chloridi,	0.25 gramme.
Potassii Chloridi,	0.10 gramme.
Sodii Chloridi,	9.00 gramme.
Aquae Distillatae,	1 liter.

M. Sig. Use for injection as directed.

THE TREATMENT OF RELAPSED AND INVETERATE CASES OF CLUB-FOOT.

BY GEORGE B. PACKARD, M. D., DENVER, COLO.

The variety of talipes called equino-varus is popularly known as club-foot, and the one that most taxes our resources. The literature of the subject is, as a rule, of unvarying success. And yet we constantly meet in practice imperfect results, due either to relapse or imperfect correction. Evidently the methods of successful treatment are not universally understood. Were more writen on the difficulties of treatment and the cause of failure, the literature would be much more complete.

The treatment of an ordinary case of talipes equino-varus, instituted soon after birth, seems a very simple matter, and it is, on account of the cartilaginous condition of the bones of the tarsus. Yet if the case is kept under observation for several years, there are apt to be obstacles to overcome and annoyances in locomotion that will give rise to a great deal of anxiety, depending upon how completely the deformity was corrected and how thoroughly the foot has been retained in the new position.

It is not necessary to give a detailed account of the pathological anatomy of club-foot, as that is generally well understood, but, briefly expressed, there is a distortion of the bones and short-

ening of the ligaments, fascia, tendons and skin. The four bones that form the medio-tarsal joint, viz., the astragalus, os calcis, scaphoid and cuboid, are either distorted or misplaced. The neck of the astragalus and anterior facet are inclined inward, and as a result the anterior portion of the foot is markedly inverted.

The os calcis is rotated on its vertical axis in proportion to the severity of the case, the anterior extremity being directed outward and the posterior extremity inward. It also approaches the vertical position. The cuboid, following the direction of the anterior part of the foot, articulates with the inner side of the anterior extremity of the os calcis, and consequently is very difficult to correct in those cases where the distortion of the os calcis is well marked, while the scaphoid, which is inclined inward, is easily corrected, as the position is caused by the bend in the neck of the astragalus—a very different condition to that existing between the os calcis and cuboid. The peculiar distortion of the os calcis has not probably received sufficient attention in the past, in the treatment of club-foot, either in correcting or retaining the foot in position after correction. We are apt to think of the anterior extremity of the os calcis as taking the same direction as the neck of the astragalus which has been taught by some teachers in the past.

The cases that I want especially to call attention to are those that have been treated perhaps for several years unsuccessfully, where serious defects remain after what we, ourselves, had thought were complete cures, and also those cases that have not been treated during early childhood.

The majority of these cases will not yield to the ordinary treatment that is successful during the first two or three years of life. Forcible correction under ether, subcutaneous tenotomy, fixation for a while with plaster and a retentive shoe are generally sufficient in the early cases to bring about a good result if carefully looked after for a reasonable time.

When it is found that the foregoing method does not correct the foot a great variety of operations have been advised. Many of these procedures have been found unsatisfactory and too mutilating.

Among those most employed are: The open incision of

Phelp's; linear osteotomy of the neck of the astragalus; wedge-shaped tarsectomy and enucleation of the astragalus. Of these the method of open incision so strongly recommended by Dr. Phelps, of New York, appeals to me as the most rational, and I believe will be found in the great majority of resistant cases to be sufficient to overcome the deformity, especially when supplemented by a stretcher of considerable force.

We may not have at hand as powerful a machine as Dr. Phelps used, but an ordinary club-foot stretcher with key and ratchet will generally be found sufficient to complete the correction.

The following resistant cases were treated by the writer by this method.

Case 1. A boy aged 9 years. Equino-varus, high degree, marked inversion; walked on outer side of foot, heel elevated. Had been treated constantly from infancy by various braces and subcutaneous tenotomies. Was under my care for several months, during which time I resorted to extreme force under ether, subcutaneous division of tendons and fascia followed by apparatus. I could not correct the deformity by these means.

September, 1898, I made an incision beginning in front of the internal malleolus and extending one-fourth the distance across the foot, this incision being over the head of the astragalus. I then divided the plantar fascia, abductor hallucis muscle and tendon of tibialis posticus muscle, flexor brevis digitorum and tendons of the long flexors.

Force was used after the division of each of these shortened tissues, but as the foot did not come into position I then divided the anterior part of the deltoid ligament and the inferior calcaneo-scaphoid ligament, both of which exert a powerful influence in keeping up a cramped position of the inner border of the foot as they form a strong bond of union between the malleolus and scaphoid and the os calcis and scaphoid. It was also found necessary to divide some of the inner fibers of the calcaneo-cuboid ligament.

The foot was then placed in position, and in doing so the scaphoid was pulled forward and the astragalo-scaphoid joint was somewhat separated. The tendo Achilles was divided before

the open incision in this case. As a rule I prefer to divide it after the open incision.

The dressing consisted of Lister's protective, aseptic gauze, cotton and plater of paris bandage. The wound was entirely healed in five weeks. A retentive brace was then applied and the patient allowed to walk. The foot was in perfect position and there has been no tendency to relapse after a period of nearly three years.

Case 2. Male, aged 5. Although this case was comparatively young the foot was extremely rigid and various unsuccessful attempts had been made at correction since birth. Large bursæ had developed on dorsum of foot over cuboid and base of the fifth metatarsal which was the walking surface of the foot.

An incision was made and similar structures divided as in the preceding case. A great deal of force was used by the club-foot shoe, and after the tendo-Achilles was divided the foot was over-corrected, the usual dressing applied. The wound healed satisfactorily and a retentive brace applied. Over a year has elapsed since the operation and there has been no tendency to relapse.

Case 3. Female, aged 15 years. Position and condition that of severe talipes equino-varus. Mother was very much discouraged about treatment as all attempts at correction of the deformity had failed. However, she finally consented to have an operation performed, and I made an open incision and divided the resisting tissues as in the preceding cases.

The tendo-Achilles divided and the foot thoroughly stretched by apparatus. I was then able to get the foot into an over-corrected position. The wound healed in the usual time and there was no relapse at the end of three months, the last time I saw the patient.

It seems to me that it is better not to use the Esmarch bandage, as there is little hemorrhage during the operation unless the internal plantar artery is divided and the oozing is much less troublesome after the operation.

As the various structures are divided on a director we can generally avoid the internal plantar artery and nerve. If, how-

ever, the nerve stretches across the gaping wound it is better to divide it, although some numbness would follow.

All of these cases were extremely resistant to treatment. I am sure none of them could have been completely corrected by subcutaneous tenotomy and mechanical treatment. They all yielded readily to this method.

It has been said in criticism of this operation that it is unnecessary in the milder cases and is insufficient in the severe cases. After a little experience with this method I think one feels that this criticism is unjust. It has also been said that a sentitive scar with a tendency to contract is apt to follow. While it may be true in some cases for a short time, I think it is of little importance and is soon unnoticed by the patient.

In exceptional cases the division of the soft structures is not sufficient to allow the foot to come into a correct position on account of the more marked bone distortion. The obliquity of the neck of the astragalus and the distortion of the head of the os calcis by a rotation of this bone upon its vertical axis are the two factors that obstruct the return of the anterior part of the foot to a normal position.

It is only rarely that these distortions prevent the foot from being corrected in these resistant cases. In the few exceptional instances, however, the indications are very plain, viz., in the first place to divide the neck of the astragalus by an osteotome through the open incision already made or dividing the inferior calcaneo-scaphoid ligament and separating the astragalo-scaphoid joint, as was done in case one.

The space evidently fills in with fibrous tissue and does not prevent motion at this point. Either procedure will be sufficient to bring around the foot unless the os calcis is so distorted as to prevent the cuboid from being forced into position; in the latter case it is better to remove a wedge-shaped piece of bone from the outer side of the os calcis. This should be done back of the cartilage, which will not disturb the medio-tarsal joint. If one is careful this can easily be done in the anterior extremity of the os calcis without cutting into the sustentaculum tali on the inner side.

It will rarely be necessary to remove the astragalus or a

part of it for the equinus feature when the neck of the astragalus and os calcis has been divided in a proper plain. For the latter procedure, in addition to the open incision, will correct the equinus as well as the varus in the most stubborn cases. Yet in cases where the astragalus is so deformed as to become a foreign body, and where it completely prevents flexion from its shape and size, it may be better to remove it or its anterior part. But I think this operation is very rarely necessary and the later effects are not as satisfactory as has been supposed. Flat-foot and badly shaped feet are apt to follow.

It is very important in operating upon club-foot not to mutilate the foot in a way that will cause rigidity after recovery.

It would seem from the experience of Dr. Phelps that bone operations were rarely required. In his recent article in American Medicine he says he has operated on 1,650 cases. There were performed seventeen bone operations, including linear osteotomies, cuneiform resections and removal of cuboid and scaphoid bones. In other words, Dr. Phelps has only found it necessary to perform seventeen bone operations in operating on 1,650 cases, and most of the cases occurred during his first few years of experience with the operation of open incision.

In an article read before the Orthopedic Association a few years ago by H. Augustus Wilson, of Philadelphia, on bone operations for correction of club-foot, based upon an analysis of 435 operations, many interesting facts are recorded. Over 50 per cent. were operated upon prior to the age of ten years. About 30 per cent. prior to the age of six years and about 9 per cent. under two years. He remarks: "I have been unable to ascertain the grounds for selecting bone operations in preference to other well-known and equally reliable procedures prior to the age of eight and twelve, at which time it is presumed that the bones of the foot are firmly ossified and unyielding.

"More than one-third of the cases the astragalus was the only bone removed. In nearly two-thirds of the cases the astragalus with one of the other bones of the tarsus was removed entirely or in part."

He further remarks: "The very extensive amount of bone removed in so many of the cases here recorded would seem to

more clearly indicate the necessity for resorting to other measures to which Phelps has so ably drawn attention before attempting correction by removal of bone. To my mind the percentage of cases suitable for bone excision is extremely small." This is emphasized by quoting from personal letters obtained in the course of his efforts to obtain these statistics, from Professor A. Lorenz, Dr. W. J. Little, Dr. Nicholas Senn, Dr. B. E. McKenzie, Dr. Lewis A. Sayre, Reginald H. Sayre and many others who have done extensive work in club-foot.

Notwithstanding so many cases of bone operation were reported it was surprising to learn through their letters how few bone operations had been performed by surgeons eminent in this department.

With the few exceptions referred to I think the open incision of Dr. Phelps' best fulfills the indications for treatment in these resistant cases of club-foot, and it has the great advantage of safety, the mortality being practically nothing and the resulting foot is more shapely, not having been shortened by the removal of bone but really lengthened by straightening out the inner border and the mobility of the foot is not restricted as the articulations are left intact.

A GENERAL CONSIDERATION OF THE X-RAY IN MEDICINE, SURGERY, AND MEDICAL JURISPRUDENCE.

BY G. H. STOVER, M. D., DENVER, COLO.

The X-ray, as I understand it, is a form of radiant energy in many ways similar to light; its waves are transmitted through a number of substances impermeable to ordinary light.

It does not possess the power of exciting a visual sensation in the retina, thus making it necessary for us to employ intermediate devices in order to render its effects visible to us.

The impulses emanate from a point and proceed divergently from their source. This is the reason why the X-ray must be

very carefully used and its findings carefully translated or it will give us apparently false information.

There are two methods of using the X-ray; the first requires a fluoroscope. This is a light-proof box open at one end, this end being shaped so as to fit closely to the observer's face when he applies the instrument to his eyes. At the other end of the fluoroscope is a chemical screen; the screen is coated with a substance which fluoresces or glows with light when the X-ray falls upon it, the chemical side of the screen being inside the fluoroscope. The object to be examined is placed in front of the Crooke's tube so that the rays will pass through it; the fluoroscope is applied on the other side of the object; the relative positions of tube, object and plate are of importance, on account of the divergence of the rays. The object should be as far as possible from the tube as is consistent with a good light in order that the image shall not be distorted owing to the great divergence of the rays near the tube. The fluoroscope should be applied directly to the object or as closely as possible to it, and the screen of the fluoroscope should be perpendicular to the rays passing through the object; we are thus not looking directly at the object under examination as is so often supposed, but we see only the shadow of the object. The fluoroscope is a very handy instrument; by its use we make the examination immediately, without waiting for further manipulation, as is necessary when skiagrams are taken; we are able to view the object from all sides, and in many instances in clinical work can show the patient himself what we have found. On the other hand, the fluoroscope does not give as clear detail of many things as does the skiagraph; it is not a permanent record; yet it is a great time-saver and is amply sufficient for many of the examinations for which the X-ray is needed.

The skiagram is a permanent record. To obtain this, the object to be examined is placed as close as possible to a sensitive plate such as photographers use, the plate being in a light-proof container of some kind which will not obstruct the passage of the X-ray, and with the film side nearest the object; the Crooke's tube is placed on the other side of the object and as far from it as is consistent with a good light; the time of exposure varies

for different objects, depending on their thickness, density, the character of X-ray which is being given off by the tube, and the nature of the information that is desired. Two classes of tubes are used, the soft and the hard; a soft tube is one that gives on the plate the shadow of the soft parts; the hard tube gives on the plate only the denser parts of the object. As in the use of the fluoroscope, the relative positions of tube, object and plate are of the greatest importance in getting a shadow that shall be as free as possible from distortion; the plate should be perpendicular to the rays passing through the part of the object under examination. After the plate has been exposed it is developed in much the same manner as the ordinary photographic negative is obtained; a fast plate does not give a better result than a slow one. Prints may be made from these negatives as in regular photography; the negative is better for study than the print from it, for the reason that the details are clearer.

In studying these negatives, place them on the sash in the middle of a window in such a way that they will have the clear sky or pure white cloud as a background, with the film side of the plate away from you. If, for instance, the object examined was a right hand, taken with the palm next to the plate, you will see, when studying the plate, the right hand as if you were looking at it from the palmar side. A print from this plate will reverse the hand; that is, the print will apparently show a left hand from the palmar aspect. As the skiagram is merely the record of a shadow, you may rectify this reversal by imagining that you are looking at the object from the side opposite to that which was nearest to the plate when the exposure was made.

The X-ray is of the greatest use in surgery and dentistry in the detection of fractures and dislocations, and the finding of foreign bodies; there are some sources of error and some precautions to be taken that should be mentioned here. In a recent fracture of a long bone, if the fragments are in true apposition, the X-ray will not show a fracture line; the early callous is transparent to the X-ray and will not be shown; a little later the callous contains sufficient bony material to be revealed by the X-ray; effused blood is very opaque to the X-ray and will often obscure the bony parts in its vicinity.

Foreign bodies are usually well shown, except sometimes in the case of bullets imbedded in dense tissues, or when considerable blood has been effused. In these instances the bullet can sometimes not be seen. Small slivers of wood cannot be shown by the X-ray unless they are from wood that has been saturated by a paint containing lead; pieces of glass can be seen in tissues that are not too thick; glass, it may as well be said here, is more opaque to the X-ray than aluminum; needles are usually easily shown; lost Murphy buttons are located, as are also many of the objects swallowed by children. I have had two cases in which I have been able to see an open safety-pin in the upper part of the esophagus; in one the pin was quite large and was removed by Dr. Craig by esophagotomy, with a succeeding complete recovery; in the other case the pin was a smaller one, and the surgeon in charge of the case was not able to see it, though it was plain to me; he declined to operate, and twenty-seven days later the mother of the child brought to me the safety-pin, which had made the trip through the alimentary canal. It was a lucky will say here that the trained eye can see more, much more, in the thing that the pin did not cause serious trouble on the way. I fluoroscope or on the negative than one which is not trained to the work, and the X-ray expert's opinion should receive just as much weight as is given to the opinion of experts in other lines.

In searching for foreign bodies, it is not enough, as a rule, to see that they are present; they must be located, and for this purpose views must be taken from two or more points. A handy method with the fluoroscope is as follows: After getting the shadow of the foreign body on the screen, place on each side of the part in which it is situated, a metallic object, in such a way that the two metallic markers and the foreign body shall be in line; repeat this process from another point of view; then, by extending an imaginary line through each set of markers, it may be certain that the foreign body is at the point of intersection of these two lines.

Fractures of the skull are practically impossible of detection by means of the X-ray, because the light has to pass through two thicknesses of bone, one of them removed some distance from

the plate, and each layer of the bone of very variable thickness at different points, making a very complicated set of lights and shadows on the plate.

In the thorax we are able to see consolidations, excavations, spots of anthracosis, aortic aneurisms, cancerous growths, and observe the movement, pulsation, size and position of the heart, and to measure the excursion of the diaphragm during inspiration and expiration. The liver is quite well shown as a rule, and if the stomach contains a quantity of food, or of some substance opaque to the rays, we may outline that organ. A mixture of mucilage and bismuth, swallowed just as the examination is begun, is of value in rendering the esophagus and stomach visible. I am sorry to say that the X-ray is of no assistance in determining the presence or absence of tapeworm. I have had a number of requests for examination from parties who desired to learn if they were harboring such an unwelcome guest. Gall-stones are so transparent to the X-ray that they are practically never revealed by its use.

It is coming to be held by many that the X-ray is of great value in finding stones in the kidney. My experience, referred to in another paper, has not been sufficient for me to express an opinion of this. I think it will often be a difficult matter; it should not be very difficult to find a stone in the bladder in many of the cases.

Floating cartilages in the knee-joint cannot, in most cases, be shown by the X-ray.

I think that the value of the X-ray in finding tumors of the brain is very problematical.

There are now recorded many cures of lupus by the use of the X-ray. Personally, I have treated only one case, and that one did not continue the treatment to a cure, though I feel fairly confident that a cure would have resulted in time.

Epithelioma of the skin is being treated with the X-ray, but I believe the value of the treatment is not yet proven.

The medico-legal status of the X-ray is a very important matter, as skiagrams are more and more being introduced as evidence in the courts. I very strongly take this position: A jury has no right at all to examine a skiagram. The proper sphere

of the skiagram is in the hands of the experts who are to testify. It should be used by them simply as a means of information, in connection with the other means of examination used by them, and should no more be given into the hands of the jurymen than that they should be permitted to make use of the measuring tape, the stethoscope or the urinometer.

The skiagram never gives an absolutely accurate image of conditions as they actually exist. The skiagram must be carefully studied, and what it shows translated in connection with the findings of the other and ordinary methods of examination. Its limitations should be remembered, and its sources of inaccuracy carefully borne in mind.

Many of my hearers have practiced for a number of years, and in that time I suppose you have treated numerous fractures of long bones, and have obtained many "perfect results." It would surprise you, gentlemen, if I could show you these "perfect results" with the fluoroscope. You would find that in very many of them there was not absolute apposition of the fragments; you would see a great deal of overlapping and much bending in the line of the bones; yet these bones are as useful, and the external appearance of the limbs is as symmetric as they were before the injury. Your patients are satisfied, and probably think that if they could see those bones denuded of flesh there would be no mark to show that there had ever been a break. But let me tell you, that if you would show to a jury skiagrams of some of these "perfect results"—and they are in truth perfect surgical results—that jury would almost invariably say that there had been malpractice, or that the result was a bad one. That is the trouble with juries when a skiagram is shown to them; they immediately throw out of their minds everything that the experts have said as to the perfection of the result from a surgical standpoint, and they base their whole opinion on the overlapping or bending, or the lump of callous that the picture shows. The skiagram is misleading to a jury, and it should not be shown to a jury at all.

Gentlemen, discourage the introduction of skiagrams in evidence at every opportunity you have. Do not allow a patient of yours who is suing an individual or a corporation for dam-

ages to show a skiagram of the injured part to a jury. It is not proper evidence for a jury to see, and they cannot make a proper use of it. Some day, if the practice is kept up and becomes common, and you allow juries to compare your testimony with what they think they see in skiagrams, it is going to prove a boomerang to you, and for many years after such a practice becomes established, no man will dare to handle a fracture without the fear that he is pretty apt to be favored with a suit for damages from some one who thinks that his broken bone was not restored to its original design, leaving no trace to show that there had ever been an injury.

REPORT OF SEVENTY-SIX CASES OF APPENDICITIS OPERATED AT SALIDA HOSPITAL FROM JANUARY 18, 1899, TO JUNE 3, 1901.

BY F. N. COCHEMS, M. D., SALIDA, COLO.

A study of these cases show that we have:

1st. Recurrent.

2nd. Acute, with inflamed appendix and no great amount of peri-appendicular involvement.

3rd. Cases with localized abscess or abscesses.

4th. Those in which nature has failed to throw a protecting wall about the inflammatory area, or having done this, the barrier has not proven efficient, and as a result diffuse or general peritonitis is ushered in.

The cases are classified in this manner from a surgical standpoint, and as is well known, the all important prognosis depends to a great extent upon the class in which the case is found. While the subject seems to have been thoroughly thrashed out during the last few years, yet there is no doubt, considering the number of deaths annually, that a further study must be of value. We must arrive at some conclusion from investigation of statistics, supplemented perhaps by our own personal observations, whereby we can save the greatest number of cases, for it

seems to be established that prophylactic measures are of but little or no value.

The diagnosis is usually easy in acute cases. We should depend first upon tenderness at or near McBurney's point; second, right sided rigidity of the lower abdomen; third, nausea and vomiting (not always present); fourth, pain, often over epigastric region, gradually passing down to site of appendix. Condition of the bowels is not an index as to the condition of the appendix. Temperature if present is of some value. Its abscence proves nothing. This may also be said regarding the frequency of the pulse; still the study of the pulse is of more importance than that of the temperature.

Abdominal distention indicates that the local process is extending, and generally is due to paresis or paralysis of a portion of the intestines.

Palpation is of the highest value, but is very dangerous in some cases which have progressed to the formation of abscess. I am quite certain that I know of an abscess having been ruptured by manipulation of the abdominal wall during anæsthesia.

Percussion.—Manley says that this is an important adjunct but that when the abdomen is meteoric or hypersensitive it may be impracticable without the employment of an anæsthetic. I have never found a case so sensitive that percussion could not be employed without an anæsthetic. In several cases I have found a tympanitic area surrounded by an area of dullness, and in those cases I found an abscess cavity localized which contained gas, the gas naturally rising to the highest point in the cavity. One cannot depend on percussion in localizing the incision, or even on palpation, but when the point indicated by percussion is supplemented by palpation the line of position of the incision is fixed.

Deep puncture should be mentioned to be condemned. Rectal examination in the male and rectal and vaginal in the female, except in girls, is too frequently omitted, especially in advanced cases.

Treatment.—Every case of appendicitis should be treated surgically, if treated at all. In the early acute (first twenty-four to thirty-six hours) and the chronic recurrent cases, nearly all

operators work on about the same principles, McBurney's method being the favorite. In the treatment of localized abscess cases much difference of opinion exists, some being satisfied with drainage; others with primary drainage and subsequent removal of the offending organ during a secondary operation; others drain and in every case remove the appendix primarily.

I think that the rule should be that every appendix should be removed when the condition of the patient will permit it, unless the appendix is evidently *very* difficult to find. In such cases I cannot see the advantage of a very prolonged search for the appendix when it perhaps is quite evident that thorough drainage is possible. Still, the dangers from leaving the appendix is not small, either primarily during the healing of the wound, or later after apparent recovery from a dangerous illness. The wound closes slower than when the appendix is removed, and consequently adhesions become stronger and more numerous. As a result of this we are more liable to acute intestinal obstruction any time after recovery from the acute inflammation. This is a real danger and speaks strongly in favor of primary removal. Many localized abscess cases can be drained without cutting across muscular fibers. Still where there is any doubt regarding the possibility of free drainage an incision long enough should be made.

General Peritonitis, or beginning General Peritonitis Cases.—By general peritonitis or diffuse peritonitis is meant a condition in which a large portion of the entire peritoneal surface has been inflamed. As the patient dies in any acute case before the entire surface becomes involved, it is plain to see that the term can be applied to any condition in which there is no distinct limit to the surface involved. Therefore, any case in which there is no wall of adhesions or limiting pyogenic membrane must be considered at least a beginning general peritonitis, and treated as such.

Those who operate in the face of such unfavorable conditions employ different methods. Some irrigate with salt solution and sponge it all out before drainage or closure of the belly wall; others irrigate but leave the belly full of solution. Some pour H_2O_2 into the belly and mop it out. I prefer sponging

the pus and sero-purulent fluid until it no longer comes into the field, then to sponge all infected surfaces accessible with peroxide, and carefully pack in every direction from the wound with Nosophen gauze strips eight inches by thirty-six inches. In severe cases twelve or fifteen such strips are sometimes left in.

In all these cases the appendix is removed, for there is no harm now in going after it and tying it off, while if allowed to remain it would certainly be a focus to distribute infection, and also the absorption of toxines might be, in these severe cases, enough to turn the balance against the patient. In all severe cases the after treatment is of vast importance. Morphine should be avoided and all efforts made to obtain free evacuations from the bowels. As Robinson says, "it seems often to be a race between a free bowel movement and death." Some give cathartics a short time before operation. Calomel or C C pills as soon as the patient will retain anything, followed by saline cathartics and frequent high enemata and strychnine sulphate hypodermically will often be found of great benefit. Repeated enemata of glycerine, salts and turpentine alternating with salt solution every six hours often saves cases which would otherwise die. We elevate the head of the bed in cases where a general peritonitis exists or is imminent. This tends to cause fluids in the belly to gravitate toward the pelvis where the peritoneum is not as absorptive and resists infection better. I think it of distinct advantage in some cases. Unguentum crede is used on these cases, together with the usual stimulants where indicated.

Deaver says collapse cases should not be included as operative. For my part I cannot always decide when a case is in collapse. In other words, I take it that by collapse cases or moribund cases, operators mean those cases so far gone that no matter how successful the operation or how much may be done in any other way that the case cannot be saved. Here to me is a very interesting point so far as statistics are concerned, but I think such statements are made without a due appreciation of what is meant thereby, for providing one could accurately estimate the exact severity of any given case and know just when the case is one of collapse, or merely a very severe case which could be treated successfully surgically, the statistics of all sur-

geons would be aproximately 100 per cent. of recoveries. Again, if we deny operation to those cases considered collapse cases, are we not running the great risk of losing some cases, which, if operated upon would have lived? I believe we would; and why? So that our statistics should not be marred. That is the only reason that can be given in those cases when the patients and friends are willing and oftentimes anxious that something should be done, and the surgeon denies the patient possible relief. Yet I have heard surgeons say, and apparently feel proud of the fact, that they have had opportunity to operate on a case and would not do so because it was supposedly too far gone.

While I feel that we come in contact with cases that are actually dying, and do die, say in an hour or so, still in such cases we are never asked to do anything, for the laity know the signs of impending death nearly as well as the surgeon, and sometimes better. The point I wish to make is that we should, and must, be very careful not to consider the serious unfavorable cases as dying because he is very sick.

Working on these lines, I have operated on every case of appendicitis that presented itself for treatment, since January 1, 1899, at Salida Hospital. No case was refused operation; it mattered not whether it was a simple recurrent case or complicated with general peritonitis. The number operated was 76; mortality, 2 cases. Perhaps some would add another, but I will allow you to decide. I will read the history later.

I believe in operating every case.

I believe in removing every appendix when possible.

I believe in thorough walling off and drainage in all pus cases which are doubtful.

I do not believe in waiting for the case to become more serious than on first visit before operation is advised. I do not believe in saying catarrhal cases should be allowed to go unoperated, for who is so wise as to be able to state which case is catarrhal and which is a beginning gangrenous case? Who has ever followed this kind of treatment and not come to grief? I say no one can for any length of time without judging wrongly in some case, and as a result have a death to record, or to be recorded by his friend, the surgeon. Now, when it is remembered

that any number of authorities can be quoted as saying that they have never lost a recurrent case, or a case during the first twenty-four hours, or say thirty-six hours, how can one justify himself by allowing a disaster to occur when it could have been avoided.

There is no surgeon of experience present who has not been called only to see a hopeless case, which perhaps had a very mild outset. Some say they will not operate if the pulse, temperature and respiration are not so and so, or if the general conditions are not so and so, or if the belly is not to a certain extent distended, or, again, they insist that if the bowels will move no peritonitis exists, or, again, if this is the first attack they will not operate unless a certain set symptom, complex, exists. This they vary if it is a recurrent case and so on. The only light one gathers from such a line of argument so far as I can see is that certain surgeons can see deeper in the belly than others before it is opened, but will not tell you just how they do so. I believe that to profess ignorance regarding the exact pathological condition present in any case before operation is wise. If one follows such a course he will be forced to open the abdomen to find out just what the situation is and then act accordingly. I make these statements as a result of a deep conviction that they are true, and that should this line of treatment be consistently followed by surgeons of experience in well equipped hospitals, a mortality of less than 1 per cent. should be obtained. In fact, one could say that all cases of appendicitis should live and not overshoot the mark much.

Which cases die? The neglected cases. Which live? Those who are operated early, and some of the neglected. But so long as we go on attempting to differentiate the case which should be operated and the one which should not, we will always have a certain percentage of unnecessary deaths, and we will always hear the attending physician say, "I did not believe he was so far gone, etc."

I say let it be generally understood by both the profession and laity that appendicitis is a surgical disease and more will come to early operation and more lives will be saved, bringing credit to the profession, and avoiding grief in many homes.

Deaver says that every case in which the appendix has

been the seat of inflammation is thereafter a source of danger to the life of the patient, and that for this reason the appendix should be removed in the interval. I cannot agree entirely with this statement, for I believe that in many cases the appendix may return to practically as near a normal condition as it was originally, and, therefore, be no more dangerous than a normal appendix. Still I agree with the later proposition, viz., that it should be removed in the interval. Why? Because no one can tell whether it is going to be good or not, but if removed and put in alcohol we know it will be good.

Of my 76 cases—

22 or 28.9 per cent. were acute.
24 or 31.5 per cent. were chronic.
24 or 31.5 had localized abscesses.
7 or 9.2 per cent. were general peritonitis or beginning peritonitis cases.
15 or 19.7 per cent. had concretions.
2 or 2.6 per cent. developed obstruction of bowels later.
2 or 2.6 per cent. mortality.

A review of some of the complicated cases may be of interest:

1st. Mr. H. L. D., 24 years old, U. S.; operation 78 hours after onset; had two attacks during three months previous to present illness; usual symptoms; severe attack; was referred to me by Dr. Coffman, of Minturn. Examination showed board-like hardness of abdomen, tenderness, and great pain and poor general condition. It was decided to operate at once; operation showed gangrenous appendix with ruptured abscess; abdomen contained much sero-purulent fluid, and about appendix yellow pus; sponged dry; surface touched with peroxide and packed in every direction with Nosophen gauze; appendix removed; removed packing on third to fifth day and repacked. Recovery.

2nd. Mr. F. W. S., age 40, U. S.; attack began 52 hours previous to operation; had had attacks for 8 years. Referred to me by Dr. Coffman, of Minturn. Examination showed acute appendicitis with perhaps beginning peritonitis. Operation showed ruptured gangrenous appendix with spreading of infection into

general cavity. Sponged dry and mopped with H_2O_2 ; packed with Nosophen gauze. Recovery.

3rd. Mr. F. W. H., age 34, U. S.; no previous attack. Referred to me by Drs. Mackintosh and Sanford, of Gunnison, Colo.; case was admitted to hospital 73 hours after beginning of attack, but was seen by these gentlemen only a short time before being sent to hospital. Examination showed very bad general condition; distended abdomen; great tenderness; vomiting; absolute constipation; bad pulse. Unfavorable prognosis given to friends. Operation; ether. On opening abdomen sero-purulent fluid free in peritoneal cavity; sponged dry; all surfaces in neighborhood of wound mopped with peroxide; many strips of Nosophen gauze 8 inches by 36 inches packed in all directions from wound after removal of appendix. Patient recovered and was doing very nicely, wound not completely closed, when he suddenly developed a subnormal temperature, at one time touching 95.2°; vomited; obstipation; no results after enemata. After about 24 hours he seemed to improve slightly but looked very weak. Operation was decided on and performed; after some search a band of adhesions was found acutely kinking the small bowel. This and many other adhesions were broken up and gas forced from distended loops into collapsed portion; wound closed with through and through silk worm gut sutures; pulse at one time above 160 and at times no pulse could be counted. The interne, Dr. Vedeler, after being up all night with him and noting his very low condition, went to bed and asked the nurse to awaken him when the patient died. On going to see him at 10 a. m. he was surprised to find him alive and considerably improved. He went on to recovery, but was once more while in hospital threatened with acute obstruction. Since his return home has been in perfect health.

4th. Mr. T. G., age 31, U. S., brakeman; one attack seven months previous to present illness. Examination showed local tenderness, some distention of abdomen, vomiting, obstipation, right sided rigidity; operation; ether. Incision, McBurney's, but during operation was forced to increase it downward for two inches. The abdomen wall was very thick and work was diffi-

cult. Apendix gangrenous and removed; appendix surrounded by creamy pus; beyond this and not walled off from general cavity sero-purulent material. Sponged dry; touched surfaces infected with peroxide of hydrogen and packed in all directions from wound with Nosophen gauze. Recovery with formation of fistula. Silk ligature removed and fistula closed in six months.

5th. Mrs. M. L., age 30, English; admitted to hospital complaining of abdominal pains; not well localized, but mostly pelvic. This had persisted for some time. Uterus found retroflexed, thought to be incarcated as it was about three months pregnant. As an exploratory, a medium incision was made and uterus elevated to normal position. Patient felt better but now and then complained of abdominal pain. Left hospital and about 18 hours previous to readmission was suffering great pain. Examination showed distention of abdomen, great pain and tenderness, especially over right iliac fossa. Appendicitis with general peritonitis was diagnosed. Abdomen was found to contain much sero-purulent matter. Gangrenous appendix and fecal concretions removed. Sponged dry and infected surfaces touched with H_2O_2. Wound packed with Nosophen gauze. Packing removed on fourth day and on fifth, sixth and seventh days wound was irrigated with salt solution. Morning of fifth day after operation patient miscarried; a severe hemorrhage followed on night of eighth day, placenta not having been removed; was curretted and uterus packed with Nosophen gauze; vitality very low; stimulants and intravenous injections of salt solution were used but to no avail, patient dying at 1:30 a. m. of ninth day after operation.

6th. Mr. E. D., age 24, U. S.; had one attack seven months previous; usual symptoms and very severe; treated three days by homeopathic physician. Examination showed board-Operated; chloroform; McBurney's incision, later increased by cutting downward and inward about four inches on account of the extent of the peritoneal involvement; pus oozing from general cavity; sponged dry; appendix found perforated, gangrenous and two concretions; removed; packed with Nosophen gauze; moist boric dressing applied over wound;

pulse not perceptible greater part of time during operation. Patient died nine hours after operation, never having rallied.

7th. Miss L. H., age 11, U. S.; no previous attack; not seen until third day of illness; had vomited; pains severe; abdomen hard and board-like; absolute constipation; bad general condition; diagnosis, appendicitis, general peritonitis; immediate operation; incision, McBurney's point; sero-purulent secretion escaped from general cavity as soon as peritoneum was opened; fetid odor; appendix perforated, pus exuding from it; cavity rapidly sponged out; surface sponged with peroxide; packed with strips of Nosophen gauze. Patient never improved, but died in about 26 hours.

No.	NAME	Age	Date of admission and discharge	DIAGNOSIS	TREATMENT
1	Mr. C. P.	21	Jan. 18-99 Feb. 8-99	Acute appendicitis.	Appendix removed.
2	Mr. A. H.	28	Feb. 6-99 Mch. 14-99	Acute appendicitis. Localized abscess.	Appendix not removed. Drainage.
3	Mr. J. H. S.	30	Feb. 14th Mch. 15th	Acute appendicitis. Localized abscess. Appendix ulcerated concretion.	Appendix removed. Drainage.
4	Dr. T. W. O.	25	Mch. 26-99 Apr. 20-99	Acute appendicitis.	Appendix removed.
5	Mr. F. C.	13	Mch. 31st Apr. 21st	Accute appendicitis. Localized abscess.	Appendix removed. Drainage.
6	Mr. A. T.	28	Apr. 10th May 22nd	Acute appendicitis.	Appendix removed.
7	Miss M. G.	18	May 3rd June 22nd	Acute appendicitis. Abscess.	Appendix not removed. Drainage.
8	Mr. H. D.	19	May 10th May 19th	Acute appendicitis. Ecchymotic spots.	Appendix removed.
9	Mr. F. H.	17	May 16th June 14th	Accute appendicitis. Localized abscess.	Appendix removed.
10	Mr. W. D.	41	May 28th June 9th	Chronic recurrent appendicitis.	Appendix removed.
11	Miss M. S.	13	June 19th Aug. 5th	Acute appendicitis. Localized abscess in pelvis.	Appendix removed. Drainage.
12	Mr. C. B.	19	July 29th Sept. 4th	Acute appendicitis. Localized abscess. Appendix ulcerated.	Appendix removed. Drainage.
13	Mrs. G. B.	32	Aug. 14th Sept. 6th	Acute appendicitis. Localized abscess. Appendix gangrenous.	Appendix removed. Drainage.
14	Mr. W. G.	33	Aug. 19th Dec. 27th	Acute appendicitis. Localized abscess.	Appendix removed. Drainage.
15	Mr. T. S.	26	Sept. 8-99 Jan. 3-00	Acute appendicitis. Localized abscess.	Appendix not removed. Drainage.
16	Mr. C. A.	25	Oct. 21st Nov. 9th	Acute appendicitis.	Appendix removed.
17	Mr. J. W.	22	Nov. 15-99 Jan. 31-00	Acute appendicitis.	Appendix removed.
18	Mr. H. L. D.	24	Nov. 26-99 Jan. 11-00	General peritonitis. Fecal fistula concretion.	Drainage. General cavity sponged H_2O_2 Appendix gangrenous. Removed.
19	Mrs. J. E. S.	21	Dec. 1-99 Feb. 3-00	Acute appendicitis. Appendix ulcerated. Localized abscess.	Appendix removed. Drainage.
20	Mr. I. S.	41	Jan. 4-00 Feb. 26-00	Recurrent appendicitis. Adhesions.	Appendix removed.
21	Mr. C. E. L.	30	Jan. 4th Jan. 23rd	Chronic recurrent. Adhesions—concretions.	Appendix removed

No	NAME	Age	Date of admission and discharge	DIAGNOSIS	TREATMENT
22	Mr. F. A. C.	33	Jan. 11th Feb. 3rd	Chronic recurrent.	Appendix removed.
23	Mr. F. M.	22	Jan. 16th Feb. 8th	Acute appendicitis. Perforated appendix.	Appendix removed. No drainage.
24	Mr. T. D.	18	Feb. 1st May 7th	Acute appedicitis. Large abscess. Acute obstruction. Concretions.	Drainage. Second operation for relief of obstruction.
25	Mr. E. D.	24	Feb. 18th	Acute appendicitis. Gen. peritonitis. Appendix gangrenous. Two concretions in pelvic cavity.	Appendix removed. Abdomen drained. Death nine hours.
26	Miss E. A.	21	Feb. 22nd Apr. 28th	Acute appendicitis. Localized abscess. Concretions appendix sloughed.	Appendix removed. Drainage,
27	Mr. J. W.	42	Feb. 26th Mch. 22d	Acute appendicitis. Localized abscess. Appendix gangrenous.	Appendix removed. Drainage.
28	Mr. T. S.	26	Mch. 8th Apr. 28th	Recurrent. After drainage. Hernia.	Appendix removed. Abdominal wall closed layer sutures.
29	Mr. H. D. M.	37	Mch. 27th Apr. 24th	Recurrent appendicitis. Appendix distended with pus. Adhesions.	Appendix removed.
30	Miss M. D.	30	Mch. 27th May 4th	Gangrenous appendix. Deep localized abscess. Concretion.	Appendix removed. Drainage.
31	Mr. D. E.	27	Apr. 7th Apr. 25th	Acute appendicitis. Appendix ulcerated.	Appendix removed.
32	Miss L. B.	18	Apr. 17th May 21st	Acute appendicitis.	Appendix removed.
33	Mr. A. B.	40	Apr. 19th May 25th	Acute appendicitis. Gallstones.	Appendix removed. Cholecystotomy. Removal of stones.
34	Miss L. H.	11	May 1st	Acute appendicitis. Gen. peritonitis. Perforated appendix. Concretions.	Appendix removed. Drainage. Death 25 hours.
35	Mr. G. F.	42	May 3rd June 9th	Acute appendicitis. Recurrent attacks 27 years. Adhesions. Abscess.	Appendix removed; very difficult. Incision 8 inches long. Very stormy time. Recovery.
36	Mr. P. V.	52	May 4th June 3rd	Chronic. Appendix in hernial sac.	Appendix removed. Bassini.
37	Mr. D. D.	14	May 17th June 1st	Acute appendicitis.	Appendix removed.
38	Mr. J. T.	19	June 7th June 23d	Acute appendicitis. Appendix kinked.	Appendix removed.
39	Mr. J. M.	53	June 8th July 5th	Acute appendicitis. Previous attacks. Large localized abscess. Concretions.	Drainage. Gangrenous appendix came away during subsequent dressing.

No.	NAME	Age	Date of admission and discharge	DIAGNOSIS	TREATMENT
40	Mr. F. W. H.	30	June 22d Sept. 17th	Acute appendicitis. Gen. peritonitis. Acute intestinal obstruction. Fecal concretions.	Appendix removed. Cavity sponged H_2O_2. Drainage. Laporotomy for acute intestinal obstruction. Recovery.
41	Mrs. W.C. M.	33	July 3rd July 20th	Recurrent appendicitis. Wandering kidney.	Appendix removed. Kidney anchored.
42	Mr. C. T.	27	July 4th Aug. 9th	Acute appendicitis. Localized abscess. Eagle's bill shaped appendix ½ inch long, hard and fibrous.	Appendix removed. Drainage.
43	Mr. E. H.	32	July 7th July 23rd	Acute appendicitis.	Appendix removed.
44	Mr. J. B.	38	July 8th Aug. 12th	Acute appendicitis. Localized absces.	Appendix not removed. Drainage.
45	Mr. O. M. K.	44	July 8th July 26th	Recurrent appendicitis. Ulcerated appendix.	Appendix removed.
46	Mr. J. W. F.	45	July 15th Sept. 9th	Acute appendicitis. Abscess. Gangrenous appendix. Concretions.	Appendix removed, picked out with forceps. Drainage.
47	Miss M.I.	21	July 17th Aug. 28th	Recurrent appendicitis.	Appendix removed.
48	Mr. F. F.	16	July 19th Aug. 2nd	Acute appendicitis.	Appendix removed.
49	Miss M.F.	21	July 23rd Aug. 3rd	Recurrent appendicitis.	Appendix removed. Many adhesions.
50	Mrs. M.L.	30	July 26th Sept. 3rd.	Acute general peritonitis. Miscarriage. Concretion.	Appendix with concretion removed; sponged H_2O_2. Drained. Metrorrhagia. Death in two hours.
51	Mr. T. G.	31	July 31st Sept. 4th	Acute appendicitis beginning diffuse peritonitis. Fecal fistula gangrenous appendix. Adhesions.	Appendix removed, sponged H_2O_2. Drainage.
52	Mr. R. R.	19	Aug. 7th Sept. 7th	Acute appendicitis. Local abscess. Concretions. Adhesions.	Appendix not removed.
53	Mr. G. E.	46	Sept. 3rd Sept. 19th	Acute appendicitis. Appendix ulcerated.	Appendix removed.
54	Mrs. P.L.	30	Sept. 9th Sept. 22d	Recurrent appendicitis. Appendix ulcerated. Wandering Kidney.	Appendix removed. Kidney anchored.
55	Mrs. C. T. R.	38	Sept. 16th Oct. 22nd	Recurrent appendicitis. Appendix kinked. Wandering kidney.	Appendix removed. Kidney anchored.
56	Mr. F. W. S.	40	Oct. 7th Oct. 20th	Acute appendicitis beginning general peritonitis. Appendix ruptured and gangrenous.	Appendix removed. Sponged H_2O_2. Drainage.

No.	NAME	Age	Date of admission and discharge	DIAGNOSIS	TREATMENT
57	Mr. J. F. H.	26	Oct. 22nd Nov. 5th	Acute Appendicitis. Adhesions.	Appendix removed.
58	Miss M.E.	16	Oct. 22nd Oct. 31st	Acute appendicitis.	Appendix removed.
59	Mr. C. C. W.	36	Nov. 8th Nov. 20th	Acute appendicitis. Appendix ulcerated.	Appendix removed.
60	Mr. R. A. H.	30	Nov. 29th Dec. 22nd	Acute appendicitis. Appendix ulcerated.	Appendix removed.
61	Miss R.P.	15	Dec. 28-00 Jan. 22-01	Recurrent appendicitis. Great many adhesions. Ulcerated appendix.	Appendix removed.
62	Mr. B. H.	32	Jan. 14th Feb. 4th	Recurrent appendicitis. Ecchymotic spots.	Interval operation. Appendix adherent. Removed.
63	Mrs. S. S.	23	Jan. 19th Feb. 13th	Acute appendicitis. Gas and fetal matter in cavity. Concretions.	Appendix not removed. Drainage.
64	Mr. H. F.	30	Jan. 29th Feb. 10th	Recurrent appendicitis.	Appendix removed in interval.
65	Mr. W. C. M.	32	Feb. 11th Mch. 13th	Recurrent appendicitis. Ecchymotic spots.	Appendix removed in interval.
66	Mrs. E.E.	28	Mch. 31st Apr. 18th	Recurrent appendicitis. Appendix ulcerated.	Appendix removed in interval.
67	Mr. R. B.	28	Apr. 8th Apr. 22nd	Acute appendicitis.	Appendix removed during attack.
68	Miss E.K.	18	Apr. 11th Apr. 25th	Recurrent appendicitis. Appendix short, thick and fibrous.	Removed interval; many strong old adhesions.
69	Miss M. M.	15	Apr. 14th	Acute appendicitis. Localized abscess.	Appendix not removed, think it came away during dressing.
70	Mrs. R. J. K.	45	Apr. 25th June 5th	Recurrent appendicitis. Femoral hernia.	Appendix removed. Many adhesions. Herniotomy.
71	Mr. Z. R.	29	May 11th	Acute appendicitis. Localized abscess.	Appendix removed. Drainage.
72	Mr. A. F. M.	24	May 20th May 30th	Recurrent appendicitis. Thickened appendix. Ecchymotic spots.	Appendix removed.
73	Mr. C. G.	24	May 31st	Recurrent appendicitis. Wandering kidneys.	Appendix removed. Kidney removed.
74	Mrs. A. B. G.	24	May 31st	Recurrent appendicitis.	Appendix removed.
75	Mr. J. D.	30	June 3rd June 13th	Acute appendicitis. Appendix ulcerated.	Appendix removed.
76	Miss E.R.	19	Apr. 6th Apr. 20th	Recurrent appendicitis.	Appendix removed during acute attack. Concretions.

A FURTHER REPORT ON CASES OF TUBERCULOSIS TREATED BY INTRAVENOUS INJECTIONS OF SODIUM CINNAMATE.

BY ALFRED MANN, M. D., DENVER, COLO.

The buoyant hopefulness that was the consequence of the first publications of Robert Koch concerning tuberculin has been followed by a period of reaction which is as far wrong in its distrust of new methods for the treatment of tuberculosis as was the early uncritical attitude toward Koch's great discovery. The lessons taught by Koch's work on tuberculins were the foundation upon which were based Behring's researches on diphtheria antitoxine and much besides of great value. Because as yet none of the methods of treatment based on the theories of antitoxines and immunity have been proved effectual cures for consumption, a widespread distrust of all special methods of treatment, as applied to this plague, has taken hold of the majority of the profession.

The rules of logic are the same as they have been in the past in spite of the failure of Koch's tuberculin and most of the numerous remedies patterned after it. Each remedy and mode of treatment will have to be judged for itself and criticised in the light of its theory and its practical results after trial. Because injections of modified horse serum are found ineffectual in stopping the ravages of the tubercle bacillus it is not safe to refuse the consideration of every method which employs the injection of medicaments, for the mode of action of the particular drug considered may have absolutely no similarity to that of the much mistrusted serum.

Landerer's sodium cinnamate increases the number of the white corpuscles in the circulation to more than double their normal number, and it is probably a secondary result of this change that the healing process in the tubercular areas is made much more active and complete. Neither this nor any other method will ever be found to restore to its healthy condition lung

tissue which has once been profoundly altered by the action of the tubercular poison. It is therefore to be expected that early and light cases will show more evidently the beneficent effect of any influence exerted by the treatment.

Since the report at a meeting of this society a year ago on the cases that I had subjected to Landerer's treatment, I have had occasion to employ it in a few light cases as well as in several severe ones. I therefore thought it might be interesting to report the further progress of those cases spoken of in my former paper so far as data are available, and to give the results of my further experience. For details in regard to the theory of the method advocated by Landerer, and for the details of his technic, I will refer any one interested to that paper, which was published in the transactions of this society for 1900, as well as in the Tuberculosis Number of the Philadelphia Medical Journal of December 1, 1900, and the Zeitschrift f. Tuberculose u. Heilstaettenwesen, Vol. I, Nos. 5 and 6.

Beside those cases classed as hopeless in my former paper, there were enumerated two classed as light and eight severe ones. The first of the two light cases, which had been made worse by an intercurrent attack of influenza, was that of a dentist. He left Denver for Baltimore after a treatment of only three months and has been actively practicing his profession and leading an indoor life for more than two years since. He has gained eight pounds additional in weight, although he weighed more when he left Denver than he ever did before. There are no physical signs; his general health and strength continue excellent.

The second light case was a favorable one in a young woman with moderate disease in both lungs. After a stay of only five months in Denver under this treatment, the patient returned to her home in the East, where she spent the whole summer and fall—seven months—and then returned to Denver without having lost ground. Another course of fifty injections followed, at the end of which there was apparently complete recovery with nothing but the physical signs of dry scars in both apices.

The first and second of the severe cases are still in excellent physical condition and show absolutely no tendency to return

of trouble after five years. One of the them has spent more than half the time near the Eastern sea-coast, the other spent several months during very bad weather in the East and went through an attack of influenza without any return of trouble.

The fourth case in this group finally developed tubercular laryngitis of a severe type and will not recover. The fifth case is still in the same condition as a year ago, not improving but remaining about the same. The next case, contrary to expectation, has not only held his own but was apparently much improved the last time I saw him several months ago. The seventh case has been living East for the past year and has not, from all I can learn, deteriorated. The eighth case is about the same as when last reported on.

It will be remembered that these eight cases were not only very severe ones but that a majority of them were encompassed by financial difficulties and other causes for worry which added to the gravity of the situation. On the whole, they have done considerably better during the past year than could have been expected.

Of the new cases I have seven to report to-day.

Case 1 is a tall young woman who has never been strong and who apparently contracted tuberculosis in nursing her sister, who died of consumption a few months ago. The patient had been coughing for a year. During the last three months she had had daily afternoon fever; after thirty-one injections given during three months the physical signs were reduced to slightly high-pitched and prolonged expiration in the right apex. At this time an attack of typhoid of moderate severity occurred, at the end of which the lungs showed no change. Recovery from the typhoid as well as the tubercular condition was apparently complete.

The second case is a woman of middle age with signs of active disease in the left lung down to the fourth rib in front and to below the spine of the scapula in the back. During three months of out-door life under good conditions, there was no improvement in weight or general condition. One hundred injections in the course of eight months have caused the disappearance of all rales; there is moderate dulness in the left apex down to the third rib and above the scapula in the back, prolonged

high-pitched expiration in the same area; slight mucoid expectoration still exists in which no bacilli can be found; weight during treatment advanced from 105½ to 123 pounds, the highest she ever weighed. She has returned to her home in Delaware, apparently quite recovered.

Case 3 is a man 30 years old who, a year before he came to me, had a series of severe hemorrhages followed by persistent cough and expectoration. Owing to several very severe attacks during the last few years of acute disease (Asiatic cholera, typhoid, etc.), his general condition was very much depressed—in truth he presented a severe case of neurasthenia. The physical signs of tubercular invasion extended down to the fourth rib on the right side and to the third rib on the left side. The condition of the digestive organs was very much disturbed. One hundred injections of sodium cinnamate given in the course of a year have been accompanied by the disappearance of all physical signs, with the exception of slight dullness in the right apex down to the second rib, higher pitched and prolonged expiration in the same area and an occasional click. The general health has improved very materially; cough and expectoration have ceased completely.

This was one of the cases in which progress, even in this climate, is certain to be extremely slow if it occurs at all, and the result under this treatment has been highly gratifying.

Case 4 is a young woman with chronic pleurisy in the left side and an area of tubercular trouble in the right upper lobe. The illness dates from March, 1900, when the pleurisy came on acutely with high fever. The fever continued, slowly growing less for fourteen weeks. From two to three quarts of clear serum were withdrawn by aspiration every two months or so until at the beginning of November the patient came to Colorado. Aspiration was done shortly after her arrival here; she was then put on the sodium cinnamate injections. Two months later another aspiration was found necessary, but this proved to be the last. Since then the pleurisy has subsided, leaving only massive adhesions in the lower portion of the left chest. The rales in the right upper lobe have almost entirely disappeared, the cough and expectoration entirely so several months ago. The weight

has increased from 105 to 116 pounds, the normal weight. This patient has had sixty-seven injections in seven months and the improvement has been continuous.

Case 5 is a man 50 years old. He has had tuberculosis for twenty years, with a history of numerous ups and downs. During the winter of 1899 to 1900 he had several severe colds and attacks of fever sufficient to put him to bed. Instead of recovering, as usual, he continued to lose flesh and strength, had a daily afternoon temperature and a very profuse purulent expectoration. Physical examination showed extensive involvement of the right lung with dulness to the fourth rib in front and to two and one-half inches below the spine of the scapula in the back, and numerous rales almost everywhere. There were unmistakable signs of a very large cavity in the upper lobe. Rales and coarse clicks were present above and below the left clavicle. Four and one-half months of injections cleared up all the rales except those in and immediately about the large cavity in the right lung; expectoration was somewhat diminished; the weight had increased from 128 to 149 pounds. Since then, with continued treatment, the still purulent expectoration has diminished considerably; the weight has continued to advance until now it is stationary at 165 pounds; general health and strength perfect, but the signs of the cavity persist as before. Whether continued treatment will cause healing of as large a cavity as this is very doubtful.

Case 6 is that of a young man, a physician, of good physique and good family history. His illness dates from an attack of influenza at the end of February, 1899, since which time he has had continuous trouble. There were several small hemorrhages. In spite of great increase in weight and several long periods of improvement in all the symptoms, there were occasional relapses, apparently from very slight causes, with the result that a year after he came to Colorado his lungs were in much worse condition than at first. On his arrival there was involvement of the left apex down to the third interspace; a year and a quarter afterward a hemorrhage scattered infection throughout the left lung, and the right lung also became affected. Sodium cinnamate was used at this time with beneficial effect but was not sufficient to stay the advance of the disease. In the middle of January,

1901, this patient was exposed to small-pox and a very severe attack of that disease followed. The palms of the hands and soles of the feet were covered with pustules, as was the whole body. Where before the small-pox he had had a daily temperature of 100 and over, after the attack his temperature remained normal. It was evident that the small-pox had destroyed the virulence of the tubercular poison. Three months later, the sodium cinnamate injections having been continued, the rales and other evidences of disease in both lungs had largely disappeared, his weight had increased and his general health and strength were much improved.

There was no reason to expect anything but a fatal outcome in this case until after the attack of small-pox had changed its whole aspect.

Number 7 is a case of acute tubercular swelling of lymph glands in a girl 24 years of age. On the right side of the neck are several scars, the remains of former operations for similar glands that had broken down. She had had several attacks of this kind at intervals six or eight years back. Two years ago she had pneumonia and after recovering from this she came to Colorado, where she has been ever since. April 23 she consulted me because of the recent swelling of glands in the right axilla and below the right clavicle. The mass in the axilla could be plainly felt; it was about the size of a small hen's egg and quite sensitive. There was apparently no softening, and intra-venous injections of sodium cinnamate were advised. Improvement was noticeable in about two weeks, the soreness having disappeared, and a week later the swelling was noticeably diminished in size. The glands have steadily grown smaller and harder, until now, after less than two months treatment, it is easily apparent to the touch that there are four separate glands, the largest one about the size of an almond, and the swelling below the clavicle is no longer to be detected.

As before, I used in most of the cases treated by this method, strychnine, iron and other general tonics whenever they seemed indicated. The action of the sodium cinnamate used is to cause an immediate leucocytosis, followed by greater activity in the healing process in the diseased areas. As Landerer has put

it, the whole process may be summed up by saying that the treatment substitutes an active, aseptic inflammation for an inactive one, and the result is rapid cicatrization. The sensations of the patient undergoing this treatment are those of increased well-being commonly observed in persons improving under general hygienic and climatic treatment, except that the favorable signs appear more quickly.

For the details of the mode of action of sodium cinnamate and the pathological changes that it causes in tuberculous areas, and which have been carefully followed step by step in rabbits by Landerer and others, I again refer to my former paper.

The reason for treating light or early cases by Landerer's method was usually the expected early return of the patients to the unfavorable climate in which the disease was contracted. The results, so far as my experience goes, now covering six years, as to permanency of the cure as well as its rapidity, are very satisfactory. There has been no return of trouble as yet in any of my cases that were well enough advanced to be called cured, though several have gone East to live. Even in the very severe cases the improvement that has been obtained has shown itself to be more permanent than was anticipated.

Within the last three or four years there has appeared a considerable literature upon this subject, chiefly in Germany. Favorable reports of the use of Hetol, as it is called, are more and more numerous, and unfavorable opinions are comparatively rare. Landerer himself published in 1898 a volume of over 300 pages discussing the subject in all its bearings and giving in detail his very large experience in its use. In 1900 Ewald read a paper before the Berlin Medical Society giving his impressions after the employment of sodium cinnamate in twenty-five cases of tuberculosis of the lungs. In the discussion which followed a number of other observers reported their results from its use, most of them with favorable comments. Several publications have appeared in Germany and Russia giving details of its action in animal experiment, bearing out completely Landerer's own investigations. To the writer, who has taken a deep interest in the progress of this method, it is gratifying to note the steadily growing interest which it has excited.

AN OUTBREAK OF PYAEMIA SUGGESTING BUBONIC PLAGUE.

BY J. N. HALL, M. D., DENVER, COLO.

With the permission of the other physicians interested, I report to-day several cases of septico-pyæmia occurring in different parts of Colorado during the early months of this year, with several other septic cases. We are interested in them chiefly because of their unknown origin, and their number. If a single case occurs in which, after diligent search, we find no source of infection, we may be contented in calling it pyæmia of cryptogenetic origin; if many such are seen the name becomes almost a mockery.

The data concerning several of the cases were not obtained until some time after a fatal issue, when attention was attracted to them because of the occurrence of others of similar nature. The incompleteness of the bacteriological report is thus chiefly accounted for.

The epidemic was first brought to the attention of the State Board of Health upon March 4, 1901, by a message from Drs. H. Work and R. W. Corwin, of Pueblo, Colo., asking Dr. G. E. Tyler, the executive officer of the board, to come with me to investigate certain cases in Pueblo. We responded at once, being especially anxious to have the diagnosis settled promptly if possible, because of the known presence of bubonic plague in San Francisco, and the suggestion, at least, of that disease in the clinical histories of certain of these cases, notably the ones with abscess in the axillary glands.

At the Colorado Fuel and Iron Company's Hospital in Pueblo we saw:

Case 1. Male, of middle age, worker in rolling mill. Several weeks before he had bumped his head on an overhead iron rafter in the mill, drawing a single drop of blood. The wound gave absolutely no further trouble, and may, I think, be excluded as the cause of the infection. The most careful questioning gave no clue to any of the possible sources of septic poison-

ing—sore throat, gonorrhœa, ear disease, abdominal trouble, urinary disorder, osteo-myelitis, suppurating glands or otherwise.

He had an abscess in the muscles of the right upper arm, and one in each forearm. Empyema developed just after our visit, in the right chest. The examination by Dr. W. C. Mitchell gave a pure culture of the streptococcus pyogenes. The man recovered slowly, in spite of one or two more abscesses.

Dr. W. C. Marmaduke, of Pueblo, kindly furnished the board with very full reports of the following four cases, which I give in abstract:

Case 2. Male, 55 years, machinist. No possible atrium of infection is mentioned in the history. On January 15 he had a chill, headache and pain in right axillary region. Temperature 104°, pulse 110, resp. 35. Severe sweat at night. Liver and spleen slightly enlarged and tender. Delirious.

After several days of such symptoms, a half pint of pus was evacuated from the right axillary region by incision, and for five weeks thin pus discharged. No other abscesses followed, and the patient made a slow recovery. No bacteriological examination was made in this case, apparently, but the thin pus suggests streptococcic infection.

Case 3. Male, 38, machinist. Chill February 8. The next morning he had a sore throat; temperature 104°, pulse 110. On the 11th he had a "typical scarlet fever rash" over entire body. A drenching sweat occurred during the night preceding, and a chill at 2 p. m., with a rise of temperature to 104.5°. Delirious. Heart irregular, with probably an endocardial murmur.

During the next ten days he had fever and repeated rigors, with abscesses on left wrist and on legs. Death on nineteenth day, with profound sepsis.

Dr. Marmaduke states that his "diagnosis had been pyæmia, resulting from malignant endocarditis occurring in the course of scarlet fever." The history as given me shows such careful observation of the case that I hesitate to suggest that to me the interpretation would, from the present point of view, be rather a pyæmia resulting from a streptococcic infection of the throat, the rash and the endocarditis being explained by the sepsis.

I admit, however, the force of his argument. No bacteriological examination is reported.

Case 4. Female, wife of above patient. On the second day after beginning to bathe her husband in his illness she had a chill with rise of temperature to 103°, and abscesses formed in the balls of both thumbs. Some axillary adenitis. Pus was evacuated by incision from both thumbs. When she left for the East with the body of her husband she was having occasional slight chills, with delirium at times. Her further history is unknown. She kept her thumb-nails so exceedingly short that Dr. Marmaduke believed the infection occurred there, although this is purely an inference.

Case 5. Male, 45, laborer in steel works. He boarded with the last two patients. When they became seriously ill he moved to another house. On February 17 he had a slight chill, with temperature of 102°. As he had recently had malaria he was treated for that disease. The right ankle and right wrist became swollen and red, and shortly after extensive inflammation of the lymphatics occurred, with many abscesses. Many of these were opened, the discharge being small excepting in the one in the right calf, from which a pint of pus was evacuated. The patient had the usual course of profound sepsis, and died after eleven days. No bacteriological report.

Dr. G. G. Duggins has kindly sent me reports of the two following cases from Pueblo:

Case 6. Female, age 35 years, housewife. No wound nor injury nor other known cause of the illness was found. Seen first on April 27. She had had fever with occasional chills, and rapid, feeble pulse for several days. A brawny swelling existed in the axillary region, extending to the elbow and up onto the shoulder. It was shortly incised and discharged a great amount of pus. Examination by Dr. W. C. Mitchell showed a pure streptococcus infection. There were no other enlarged glands. Recovery.

Case 7. Male, 40 years old, section foreman. Seen first April 26. No history of wound, injury, gonorrhœa, otitis or other cause. Chills and high fever for several days, with rapid pulse, typhoidal aspect and great pain. An axillary swelling similar to that in the last case was found. The discharge upon

opening it was enormous. Recovery. No bacteriological examination.

The inguinal glands were slightly enlarged, but not tender, presumably an old adenitis having no bearing upon this illness.

Dr. F. H. McNaught, of Denver, has given me the following notes:

Case 8. W., male, 43 years of age, train dispatcher. Admitted to St. Luke's Hospital March 3, 1901. No possible cause for his illness could be assigned, gonorrhœa being especially looked for. The urine was negative. After many severe chills and drenching sweats, abscesses appeared, four being opened near the shoulders, and one remaining unopened at death. The record shows rectal temperatures, fractions omitted, of 107°, 108°, 109°, and just before death, 110°. Anti-streptococcic serum was of no avail. The patient died on the nineteenth day. The blood showed marked leucocytosis, but no bacteriological examination was made.

Case 9. Female, 30 years of age, housewife. Had a severe chill, temperature 105°, vomiting, headache and rapid pulse. By the fourth day after his first visit a large abscess in the right axilla had developed. She recovered promptly after its incision. No bacteriological examination was made.

The following case has but a remote bearing upon the subject, possibly, but is of interest:

Case 10. Male, 40 years old, contractor. After many chills, sweats, vomiting and a temperature of 105°, with delirium, lasting two weeks in all, the patient expectorated a little bloody sputum. No physical signs were found in the chest. Moderate leucocytosis was present. Widal reaction negative. Anti-streptococcic serum reduced the temperature three degrees, but it rose again, although the delirium disappeared. On the third day after it was repeated the temperature promptly came down to normal and the patient made a prompt recovery. Possibly some pus was passed in one stool, but Dr. McNaught was not at all sure of it. If so, he could not state from the symptoms what its origin was.

Case 11. On March 25 and several times subsequently, I saw, with Dr. T. E. Taylor, Miss M., 48 years of age. Two weeks before she had suffered from streptococcic sore throat, so

prevalent at that time. Erysipelas of the face immediately followed, the course of which was not unusual. About a week before I saw her she had a chill, high temperature, rapid pulse, pain in the joints and great prostration. Bed sores soon followed, with an extensive abscess under the right shoulder, and she died thoroughly septic in about three weeks from my first observation. Although no bacteriological report was made after that upon the throat, with that condition and facial erysipelas preceding the sepsis there is a fair presumption that the whole process was streptococcic. The treatment usual in such cases was adopted, with very little effect so far as I could determine. Careful inquiry revealed no history of injury or other possible origin of the disease beyond the sore throat mentioned.

By courtesy of Drs. C. B. Lyman and Leonard Freeman, I report the following case, which I had the privilege of watching during my service at the Arapahoe County Hospital:

Case 12. F., male, 54 years old, laborer. He had worked in a smelter in Pueblo, but came to Denver before the illness began. On April 3 he had a chill, followed by the usual symptoms of sepsis. There was no sore throat, but a small traumatic ulcer on the shin, which may have been the origin of the infection. About a dozen abscesses were opened during the next month, affecting chiefly the left thigh and both arms and legs, and discharging profusely. Although he had albuminuria, he gradually improved, and is now convalescent.

The highest temperature was 103°. After the first two or three abscesses were opened his conditon was very desperate, but the infection seemed to lack the virulence seen in many of the cases noted.

Dr. Shippey of Orient, Colo., reports to me, through Dr. Corwin, the following case, of which I give a synopsis. It is evidently of the same general nature:

Case 13. Female, married, 24 years of age, in good health. Five weeks before her attack she had slightly scratched her right leg by stepping on a chico bush, but it healed at once, without any subsequent symptoms. Beginning with a chill, she had an inflamed spot near right ankle, followed by temperature of 106° and pulse running up to 150. Abscesses of right knee joint, left leg, left knee joint, right shoulder under scapula, and left fore-

arm followed, and were all freely opened. Double phlebitis and endocarditis supervened, but in spite of all she made a partial recovery after several months. No bacteriological examination was made, but Dr. Shippey considers the case "one of staphylococcic and streptococcic infection, with no history of the bacteria having gained entrance from without except the slight scratch on the right leg over one month before the initial chill." Anti-streptococcic serum was used without apparent benefit.

To add to the general uneasiness caused by the positive presence of bubonic plague in California, we had also, during the prevalence of the cases quoted, the two following, which, occurring in Chinamen, compelled us to consider the possibility of that disease:

The first case was seen by Drs. Leonard Freeman, G. E. Tyler, W. C. Mitchell and myself, on the part of the State Board of Health, with Dr. C. B. Richmond. The left inguinal glands were much enlarged, but the cause proved to be a deep pelvic abscess, found to be streptococcic in character, the result being verified by animal injections. Recovery.

The second was reported to Dr. Tyler by Dr. G. H. Cattermole, of Boulder, who has kindly given me the notes of the case. A Chinese laundryman, 41 years of age, had practically the same conditions as the last one, and recovered after the deep abscess was opened. Excepting for the enlarged inguinal glands, neither of these cases would have attracted our attention, and they do not, of course, deserve mention with the cases of pyæmia.

After a careful study of the cases, and fortified with a report from Dr. William C. Mitchell, bacteriologist of the State Board of Health, it is an easy matter to make a diagnosis in the cases in this outbreak. When we learned of the first few fatal cases, with the axillary abscesses in some and other abscesses in others, and much adenitis, the suggestion of bubonic plague was irresistible. The occurrence of isolated cases of septico-pyæmia attracts no special attention, but the report of so many in a small area in a few weeks, in adults of good previous health, with no known source in most of them, is certainly unusual. My own view of their genesis is that many originated, as we know that some did, from a streptococcic sore throat, possibly not severe

enough to attract much attention. A few years ago, in the epidemic of sore throat in Denver, one case of pyæmia at least occurred from this origin. I think we must also admit an unusual virulence of the streptococcus to explain the frequency of the trouble.

I have elsewhere reported two cases of pneumonia that may well be mentioned in this connection. Both occurred during the time of the existence of the cases we are studying, both were fatal, and both had the signs of profound sepsis. One, seen with Dr. W. E. Shotwell, was a case of pneumo-typhus, the beginning pneumonia clearing up and leaving a typical typhoid fever, with Widal reaction. A suppurative inflammation of the hip followed and proved fatal after operation. In the second, seen with Dr. C. P. Conroy, a very slight consolidation at the left base was accompanied with the signs of profound sepsis, with petechiæ and inflamed joints, leading us to give a fatal prognosis. The boy died on the eighth day, a malignant endocarditis probably having developed. I regret that no bacteriological study was made of these two cases. Although neither one would attract any special attention ordinarily, it is striking that they occurred at the same time as the cases of pyæmia we have reported.

Several other fatal cases, apparently of this nature, have occurred, of which I have not been able to obtain a history. Although I have entitled this article "Pyæmia," it is not with the intention of including all the cases strictly under that head. Of the thirteen cases, two may really be classed as "multiple abscesses" of some authors, with complete recovery. Cheyne doubts if they should be classed as pyæmia. Of the other five with multiple abscesses, three proved fatal, a fourth was lost to sight, and the fifth made a partial recovery.

Four cases are simply ones of enormous axillary abscess, with unusual severity of the constitutional symptoms, without known origin, and all recovering.

Case 11 had but a single abscess, but several bad bedsores developed and the woman died.

Case 10 is placed in the list simply because of the difficulty of any diagnosis, excepting sepsis, and the great improvement

from anti-streptococcic serum. A hidden and atypical pneumonia must be considered.*

In a general way supportive treatment, with early opening of abscesses was followed. Many of the cases were probably necessarily fatal from the beginning. Anti-streptococcic serum was apparently beneficial in the only case in which no abscess was found.

I feel, as do the physicians who have so kindly aided me in making this report, that the presence of these cases should be widely known, because of their obscurity when seen singly.

My thanks are especially due to Dr. Tyler, without whose assistance this publication would have been impossible.

*The case reminds one of the intermittent pyrexia without tuberculosis or malaria mentioned by Osler—Dreschfeld's idiopathic intermittent fever of pyaemic character.

THE CHEST PANTOGRAPH AND THE MANOMETER —THEIR CLINICAL USE AND VALUE.

BY C. B. VAN ZANT, M. D., DENVER, COLO.

Any device which will aid the physician not only in the diagnosis and treatment, but also in the proper recording of certain phases of his cases, has a claim on the interest of a body of medical men such as this. I desire therefore to present two instruments of precision, which have a limited range of usefulness, but which admirably meet the necessities of a certain class of cases.

First, as to this instrument, the chest pantograph. It is a device originated, I believe, by Prof. W. S. Hall, of the Northwestern Medical School, of Chicago, for purely physiological purposes, namely, the graphic recording of the contour of the chest wall and the determination of the cross-sectional area of the chest at the end of both inspiration and expiration. This instrument is but a modification of the ordinary pantograph used by the artist in enlarging or reducing a picture. The position

of the pencil is such that the outline of the chest, as recorded on the chart, may be made one-fourth or one-fifth of the actual size. In its use, the patient is placed at the side of a table, with the chest level to be depicted opposite the top of the table. A sheet of ordinate paper, ruled off in squares, a mm. in size, is fastened to the table by thumb tacks and the pantograph is then screwed or clamped to the table. By drawing the end of the brass semi-circle around the chest, starting and stopping at a fixed point, the chest contour will be perfectly duplicated on the paper. In this, a tracing of the normal chest, you will notice the large dimensions of the right half of the thorax, due doubtless to its better muscular development in right-handed persons. The advantage of the ruled paper is that it enables one accurately to calculate any diameter, or the cross-sectional area of the chest.

Now, it has occurred to me that, while the instrument was gotten up purely as a physiological device, it is capable of considerable practical, clinical utility in estimating and recording certain diseased conditions. Among these, the following suggest themselves as appropriate or its use.

First. By inspection, in a case of pulmonary tuberculosis, we make a crude estimate of the chest form, and say, "there is *some* depression in one infraclavicular region," or "there is *deficient* expansion on one side." With the exception of the cyrtometer of Voillex, which makes a cumbersome, full-sized tracing, there is no accurate method of recording this alteration in the shape of the depressed region, or of recording the amount of the defect in expansion, in inspiration, at a given examination. With the pantograph or stethogoniometer, as this instrument is often called, a reduced tracing can be made and preserved; and subsequently any increase in the condition and its amount, can be determined by another tracing. In this way we can scientifically note the progress of these features of our lung cases.

Secondly. What has just been said will apply with equal force to *any* deformity of the chest, *progressive* in character, such as that of emphysema; contraction of the chest, following pleurisy or incident to fibroid phthisis; curvatures of the spine (anterior, posterior or lateral); in intrathoracic tumors, aneurismal or otherwise, pressing out the chest wall at any point; in præ-

cordial bulging from pericardial effusion, especially in children; in distention of one side of the chest by liquid or air in the pleural cavity.

Thirdly. As a means of record, purely, in *unprogressive* deformities of the chest, it is also of value. Take, for instance, its tracing of the pigeon-breast, funnel breast, the rachitic chest, the alar chest.

Fourthly. As a definite means of keeping track of many conditions beside those of the thorax, surgical as well as medical, the pantograph is available. Thus we could record the change in size and shape of the face in acromegalia; of the head in hydrocephalus; of the neck in goitre; of the abdomen in irregular tumors and enlargement, where mensuration would not suffice; in the extremities in certain malformations, tumors, etc.

The second appliance, of which I desire to present the claims, is the ordinary manometer, filled with mercury or with physiological salt solution. It consists, as you know, of a U-shaped tube, filled with the selected liquid. To this a rubber tube is attached through which the pressure of fluid or gas can be brought to bear upon the column of liquid. This pressure causes the fluid to rise in the near or far limb of the manometer, according as the pressure is negative or positive. Clinically this instrument has been used for years in estimating expiratory pressure. Of this I do not desire, however, to speak; but rather of a new field of usefulness in the surgery of the chest.

To enable the writer better to present its value in that field, you will pardon a word on the physiology of the pleura. As you are well aware, by virtue of the elasticity of the lung parenchyma, there is a constant tendency for the lung to pull away from the chest-wall—that is, a tendency to a separation of the pulmonary and costal layers of the pleura. Normally this cannot be accomplished; nevertheless the elastic pull is there, and leads to a constant condition of negative pressure or "suction," if you prefer, in the pleural cavity, known as the intra-pleural or intra-thoracic pressure. Its amount is 6 mm. of mercury at the end of expiration, 9 mm. at the end of inspiration. If after connecting it with a manometer, you insert a small hollow needle carefully through the chest wall, the moment it enters the pleu-

ral cavity, the suction there leads to a movement of the mercury in the manometer toward the pleura. If, through disease, the layers of the pleura are adherent to each other, the pleural cavity is thereby obliterated, and its negative pressure annulled. Under these circumstances, there will be no movement of the fluid in the manometer toward the chest. Thus the manometer affords an easy and safe method of disclosing the presence or absence of pleural adhesions in any case. To Sapiejko belongs much credit for introducing this simple method of procedure. Its value will be apparent when you consider the present status of lung and chest surgery. To-day, abscesses of the lung are being directly opened; gangrenous, tuberculous and actinomycotic foci, in the lung, are being excised; cavities tubercular and bronchiectatic, are being opened and drained or topically treated. Much success has attended the direct treatment of these tuberculous cavities and of lung abscesses. In a recent article (Revue de Chirurgie, July 10, 1899) Sapiejko concludes, from a considerable experience in lung surgery, that incision of the pleura and lung may lead to a favorable issue, *if* pleural adhesions exist; and fortunately, these are present in the majority of cases in which suppurative processes occur in the lungs. It is therefore of the highest importance to determine whether adhesions *do* exist and their exact situation, so that the shortest and least dangerous route through them to the focus of lung disease can be determined. This the manometer readily accomplishes. Moreover, where no adhesions exist, the instrument gives instant warning of the penetration of the costal pleura and prevents unnecessary penetration of the lung.

In cases where it is desired to use Murphy's artificial pneumothorax method for the treatment of pulmonary tuberculosis, the presence of firm pleural adhesions is prohibitive and here the manometer gives valuable preliminary information.

By many observers it is coming to be believed that in pulmonary hemorrhage, the intra-pleural injection of air or nitrogen to compress the bleeding lung, is a very valuable resource. Henry P. Loomis (New York Medical Record, May 19, 1900) says: "It has never failed, in my experience, to stop pulmonary hemorrhage, even in desperate cases." Stubbert and C. P.

Thomas give similar testimony. (Journal American Medical Association, October 28, 1899.) If there are no adhesions over the bleeding lung, this method is immediately available and this question of the patency of the pleural cavity is readily determinable by the manometer. In all of these cases, its employment seems preferable to that of the more crude method proposed by Murphy to determine adhesions.

Finally, theoretically it would seem, where the pericardium has to be opened, that adhesion of the two pleural layers overlying the pericardial sac might previously be determined by this method. If adherent, a fairly direct route to the pericardium would be open. If not adherent, a more indirect course would have to be taken to avoid pleural infection.

While the two instruments to which attention has been called have no special relation to each other, they have been presented together because they illustrate the constantly increasing debt which clinical medicine and surgery owe to physiological research.

DISCUSSION.

Dr. Taussig: It seems to me that there is one point which Dr. Van Zant did not mention which might be of service. That is in the cases of pulmonary trouble in which we wish to use calisthenics. By measuring the chest repeatedly with this instrument we can demonstrate to our patients the value of calisthenics.

Dr. Tyler: I have had no personal experience with the pantograph, but have been much interested in the matter since reading an article last winter by a Chicago physician. It seems to me that if the pantograph can be securely adjusted and if the patient can be held sufficiently still, that valuable information may be obtained by its use. But from a theoretical standpoint I should doubt whether it is possible to exercise special care to avoid making mistakes; however, as before stated, my experience is purely theoretical and not practical.

Dr. Munn: In reference to the point which Dr. Tyler has made, I desire to call attention to the fact that there is an engineering instrument, called, I believe, the areometer, which might well be used in connection with the pantograph for the more careful study of the diagrams made. This little instrument

which has two arms attached to a wheel upon which a vernier-like scale of figures is indicated, is operated by setting the scale at zero, fixing the extremity of one arm and then running the extremity of the other around the figure that has been drawn upon the cross-section paper. The exact area of the drawing is thus indicated upon the wheel. In cases where the asymmetry of the drawing made by the pantograph is slight and not readily perceptible to the naked eye, it would be feasible to divide the outline into four parts by a horizontal and vertical line intersecting at the center of the figure; then by the use of the areometer the definite and exact area of each quarter could be determined.

A STUDY OF THE TEMPERATURE, PULSE AND RESPIRATION IN THE DIAGNOSIS AND PROGNOSIS OF CERTAIN DISEASES OF THE BRAIN.

BY J. T. ESKRIDGE, M. D., DENVER, COLO.

The following paper is based upon about twenty years' personal experience in carefully observing the temperature, pulse and respiration in all cases of disease that have come under my care during that time. For the most part, during this period, my practice has been limited to the diseases of the nervous system. During the three years that I was busily engaged in investigating surface thermometry, both in private and hospital practice, in Philadelphia, I began to realize that from a careful study of the temperature, by means of the ordinary clinical thermometer, the pulse and respiration, much information of especial value in the diagnosis and prognosis of certain diseases of the brain might be obtained. In observing the surface temperatures of corresponding portions of the body, as well as those of the head, I found differences of temperature between the two sides of the body in some diseases of the brain, especially in cases of hemorrhage into the brain substance, both of the apoplectic and traumatic varieties, and in many cases of apoplexy, caused by thrombi or emboli. In apoplexy from hemorrhage a difference

in temperature of the two sides of the body was noticeable immediately after the stroke. On the other hand, in cases of apoplexy, either thrombotic or embolic in origin, scarcely any appreciable difference of temperature of the two sides of the body occurred before the third or fourth day. This difference seemed to be due to acute softening, which begins at about this time. Having made over 20,000 surface temperature observations of the head and body, I came to the conclusion that the results were of too little value to justify the time and labor required in making the observations. In 1882 I began bilateral axillary temperature observations in nearly all cases of disease of the brain that came under my care.* This practice I have continued up to the present time, with few exceptions, in hospital and in private work, when I have had trained and intelligent nurses to assist me. If no appreciable difference in the axillary temperatures is found on making the observations two or three times in a given case, the bilateral axillary temperatures are not taken again, unless a change in the symptoms of the patient seem to justify it. If a continuous difference is found in the heat of the two axillæ, the temperature in each axilla is registered, so long as the difference exists.

The statements made in this paper in regard to the value of temperature, pulse and respiration as aids in the diagnosis and prognosis of certain diseases of the brain, are based upon the records and observations of 374 cases, grouped as follows: Meningitis (tubercular), 80; meningitis (from suppuration of the ears), 20; apoplexy (from hemorrhage, thrombi and emboli), 60; acute alcoholism, 40; acute fatal cases of insanity, 12; tumor of the brain, 60; abscess of the brain, 14; cases of traumatism of the brain, in which were observed two or more of the following conditions: shock, hemorrhages, depressed bone, contusion or laceration of the brain and its membranes, 88. On more than one-half of the above autopsies were made.

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*See Transactions of the College of Physicians, of Philadelphia, Pa., for 1883, two papers by J. T. Eskridge, M. D., one entitled Report of Three Cases of Abscess of the Brain, and the other, Tubercular Cerebro-spinal Meningitis.

. As accuracy and uniformity of observation are absolutely necessary to obtain reliable and scientific results, I will state the methods employed in observing the temperature, pulse and respiration. To prevent repetition, when degrees of temperature are used in this paper, the Fahrenheit scale is meant.

It is not enough to have recorded the temperature of the body, the frequency of the pulse and respiration per minute. The temperature, as manifested in different portions of the body, and in certain cases at corresponding portions of the two sides of the body, the variations in the frequency and character of the pulse, and the respiration, with its numerous variations from the normal, should be noted at regular intervals. In all acute brain cases these observations should be repeated every two or three hours during the day and night. In cases in which an early diagnosis is of the first importance as a guide in the treatment, the physician should not rest satisfied with the records of the trained nurse, but he should personally repeat the observations for himself. The more experience one has in making such observations, the more keenly he appreciates the necessity for absolute accuracy, and the sooner he becomes impressed with the fact that much care and patience are needed for the work. One of the essential qualifications for all such clinical details is a fondness for scientific investigation, both for the physician and nurse. If the physician is not accurate, observing and painstaking, the nurse will not be. Some nurses are mentally totally unfitted for scientific observation and never can become close and reliable observers. The same may be said of many physicians.

On looking over the clinical charts used in some hospitals I have failed to find any space marked for recording the respiration. It is rarely that I meet with graduate nurses who have been taught during their hospital training especial features to be observed in regard to the temperature, pulse and respiration in certain brain cases. It is quite evident, if nurses do not know what to look for they will not observe and record clinical details that may greatly aid physicians in the management of serious cases. That nurses should be taught to become close observers

of variations from the normal, and to note such observations in writing on the hourly record sheet, needs no argument.

Temperature. If the temperature is taken only two or three times a day, it should be observed at the same hours each day and in the same portion of the body. In all critical brain cases, however, it should be registered every two or three hours, and in some cases every hour, both day and night. Occasionally the nurse is required to take the rectal temperature in brain cases. In all cases in which bilateral temperatures are not required and in which the patient is sane, conscious and free from delirium, the mouth is the preferable place in which to place the thermometer. It must be remembered that if the mouth has been held open for several minutes, it will become cooler than normal and that hot or cold substances held in the mouth will cause a variation from the normal of the temperature in the mouth. The precautions necessary to be observed are evident. I wish to say a word here against the employment of "the minute thermometer" in all cases in which absolute accuracy in temperature observations is of the first importance. These thermometers are so delicate that a little pressure made on the bulb may cause the mercury to ascend half a degree or more. I prefer the three-minute or five-minute clinical thermometer. It is well to let the thermometer remain in place one minute after the mercury ceases to rise.

In registering the temperature in the axilla, one must remember that after all precautions have been taken to prevent error the axillary heat will be about one-half degree less than that of the mouth. Some writers, especially of text-books for nurses, state that the temperature of the mouth is one degree above that of the axilla. I do not believe that this difference between mouth and axillary heat will be found in cases in which the proper precautions are taken to enable one to get the exact axillary temperature. It is well to remember that when lying in bed we often expose the axillæ, and that these being damp, cool quite rapidly. Again, in lean persons there is a considerable hollow in the axilla when the arm is lying against the body, so that the patient may hold the thermometer in the axilla without the bulb being against the flesh. In all cases in which the

axillary temperature is to be taken, I direct the nurse to dry the axilla with a cloth, cover the patient to the neck and see that the arm on the side corresponding to the axilla in which the temperature is to be taken is kept lying across the chest for a period of at least five minutes before the thermometer is put in place. The thermometer is held by the nurse with the bulb against the upper portion of the axilla, while the upper arm is held firmly against the chest. The thermometer is held in place one minute after the mercury ceases to rise. In cases of hemiplegia, in which bilateral axillary temperatures for some reason are not taken, the nurse should alternate between the right and left axilla in taking the temperature each time.

Bilateral Axillary Temperatures. It is very important to register the temperature in each axilla in certain acute unilateral brain diseases. It is rather difficult for a nurse to learn to do this accurately. The same precautions mentioned above for taking the temperature in one axilla is necessary with both axillæ. The only source of error under such circumstances is, that normally the temperature in the axilla in which the thermometer is to be placed last will be a fraction of a degree higher than the one in which the thermometer is placed first, provided, however, that the heat is the same in each axilla. The difference is due to the fact that the axilla in which the temperature is registered last is covered and protected from the air of the room for a longer time before its temperature is registered than is the case of the axilla, the heat of which is taken first. To overcome this source of error, I direct the nurse to alternate between the right and left axillæ. If the temperature is taken first in the right axilla, the next time the thermometer is placed in the left axilla first. Thus she alternately takes the right or left axillary temperature first. The same results may be obtained by seeing that the axilla in which the temperature is registered last is covered no longer than the one in which the thermometer is first placed. In registering bilateral axillary tepmperatures the thermometer should be allowed to remain in each axilla one minute after the mercury ceases to rise.†

†A large magnifying glass enables one to read with ease the thermometer while it is still in the axilla.

Pulse. In nervous and apprehensive subjects it is well not to count the pulse while the patient is excited. For the reason that the patient is usually made less anxious by the presence of the nurse than by that of the physician, the former can frequently succeed better than the latter in getting the average frequency of the pulse. After the frequency of the pulse is noted, its character should be studied, as to whether the impact of the blood in the artery, as felt by the finger, is slow or quick, weak or strong, small or large, and whether the pulse is compressible or incompressible (soft or hard). Next the rhythm of the pulse should be studied, whether it is regular, irregular or intermittent. If the pulse is noted as irregular or intermittent, the frequency and character of the intermissions and irregularity should be stated. An intermission may take the place of one or more beats, or it may occur only once or several times a minute. An irregularity in the pulse may consist of an inequality of the beat or of a lengthening of the space between some beats, and these may occur frequently or infrequently. These nicities of details an intelligent and well trained nurse can soon learn to make with ease and accuracy. It remains with the physician to interpret their meaning.

At the risk of some repetition, I shall go a little into detail concerning the pulse before studying the temperature, pulse and respiration in connection with individual diseases of the brain.

A rapid pulse is found under so many different conditions that extreme frequency alone may have little significance. On the other hand, a rapid pulse, in connection with other symptoms, and in individual cases, may aid the physician in diagnosis and prognosis. A child is suddenly taken sick, with or without a convulsion. The most careful inquiry fails to elicit any previous indisposition on the part of the child. If the parents are sufficiently intelligent and observing to enable one to rely upon their statements, a pulse numbering 120 per minute and regular in character, and a temperature of 104° or 105° would indicate that the disease was not organic trouble of the brain, unless there were some localizing brain symptoms, such as are sometimes found in meningeal hemorrhage. A pulse of 100 to 120 and a temperature of 102° would be consistent with a tentative diag-

nosis of tubercular meningitis being probable, if other symptoms pointed to such a condition.

A child is acutely taken sick, the prominent symptoms being ushered in with or without convulsions. I use the word acute here to indicate some previous indisposition, in contradistinction to sudden, in which no such symptoms can exist. An extremely rapid pulse, 120 to 140 per minute, with a temperature of 105°, would almost enable one to exclude meningitis and suspect scarlet fever. A pulse of 100 to 120, a temperature of 104° or 105° and respiration 30 to 40 per minute would indicate pulmonary, instead of brain trouble. An uncomplicated acute meningeal inflammation is usually ushered in with a pulse from 90 to 120, a temperature of 102° to 103°.

A person is stricken down by apoplexy, with or without hemiplegia. The more rapid the pulse the greater the probability is that the apoplectic attack is due to a thrombus or embolus and not to hemorrhage. Exceptions exist when the hemorrhage is in the ventricles or in the substance of the pons or medulla, or is so large as to be rapidly fatal. In these instances the pulse may be rapid, but the low temperature in large hemorrhages, either in the substance of the brain or in the ventricles, would indicate the nature of the lesion.

A rapid pulse soon after the receipt of a traumatic injury to the brain points to contusion, or laceration, rather than to hemorrhage or compression. It must be borne in mind that injuries to the brain, sufficiently severe to prove rapidly fatal, are usually attended by a frequent pulse soon after the occurrence of the injury.

A frequent pulse as the disease advances. In meningitis the pulse gets slower as soon as exudation within the cranial cavity takes place. A continued frequent pulse indicates a rapidly fatal case. The pulse almost invariably becomes rapid before death, and the more frequent the pulse, other things being equal, the sooner the end will be reached. After the shock is over in apoplexy, whether the "stroke" has been due to hemorrhage, thrombus or embolus, a rapid pulse lends gravity to the prognosis. A continued frequent pulse in traumatism of the brain, be the lesion hemorrhage, compression or inflammation, or all

combined, warrants, in the majority of instances, a cautious or bad prognosis. In all cases of death from a brain lesion, dissolution, if it takes place in the usual manner, is preceded by a frequent pulse. A careful study of the pulse in connection with the temperature and respiration will enable one often to indicate approximately the time when death will take place. We have all watched cases of brain disease in which the pulse, temperature and respiration indicated a speedy termination, and we have felt inclined to tell the patient's friends that death would probably take place within twelve or twenty-four hours, but our experience has taught us to be more cautious. We have said "Without a change for the better, death will probably occur within twelve or twenty-four hours." I have seen a few such cases recover, and others linger several days. We must remember that symptoms indicating a speedy dissolution may be due to temporarily acting causes, such as a distended bowel, inactivity of the kidneys, insufficient food, or insufficient supporting treatment. Did we know the exact pathological lesions within the cranium we could not measure the vitality and resisting power of each individual. Any irregularity or intermittent character that a rapid pulse may have gives increased gravity to the case.

A slow pulse in organic brain disease generally indicates increased intracranial pressure. There is a probable exception in abscess of the brain in which intracranial pressure often seems not to be increased. The slow pulse in this disease has been attributed to the poisonous and depressing effects of toxines on the brain, especially inhibiting the vital centers. It must also be remembered that a sudden increase of the intracranial pressure to such an extent as to overwhelm the functional activity of the brain, the heart uncontrolled, is allowed to beat away at its own "sweet will." A slow pulse of 60 to 80 is the rule in the exudative stage of acute meningitis. A pulse from 40 to 60, especially if irregular and intermittent as it usually is, denotes great cerebral disturbance and rapid progress of the disease. These are the cases in which sudden death often occurs, apparently from the exudate, either directly or indirectly affecting the cardiac and respiratory centers. The slower the pulse in apoplexy the greater the probability is that the stroke is due to hemorrhage. The

typical pulse of abscess of the brain is a slow pulse until that stage is reached in which the functional activity of the brain is greatly impaired. In traumatism of the brain a slow pulse denotes in the majority of instances either hemorrhage or a depressed fracture, and if the pulse is irregular or intermittent that the respiratory and cardiac centers are affected. A severe shock sometimes gives rise to a slow pulse.

It would be interesting to study in detail the irregular and intermittent pulse in organic disease of the brain, as illustrated by a number of well observed cases, but time will not permit. Suffice it to state that neither a rapid nor slow pulse in many cases has more significance in weighing the probable outcome of a case than the degree of irregularity or intermission of the pulse. The greater the prominence of these variations from normal the graver the prognosis.

Respiration. That one can rarely count his own respiration accurately I have repeatedly demonstrated, both in my own person and in the persons of others. The normal respiratory act is unconscious and involuntary. We can at will make the act conscious, and to a certain extent, voluntary. We have it in our power to increase or lessen the number of respirations per minute. As soon as one attempts to count his own respirations he becomes intensely conscious of them and as a rule unintentionally increases or lessens the number per minute. Not only does he modify the frequency, but it is difficult to prevent modifying their character. Some respirations will be fuller than others, and occasionally, if he does not avoid becoming too intensely absorbed in what he is doing there will be a sighing respiration. The number of my respirations per minute when I am quiet, I have been informed, is about 18. I have repeatedly tried to count my respirations and I have often gotten from 20 to 23 per minute at the same sitting. I have on a number of occasions counted the respirations of nervous patients while they were unaware of what I was doing, and then immediately afterwards counted them after I had informed them I wanted to see how rapidly they were breathing. The result has almost invariably been 3 or 4 more respirations in the last count per minute than in the first. In a few cases the result has been reversed.

The lesson to be learned from these observations is, not to let the patient know when we are counting the respirations. My rule is to lay my finger on the patient's pulse and count the respirations while the subject thinks I am counting the pulse.

In observing the respiration, its frequency and character should be studied and noted. Its character is either regular or irregular. If the respiration is regular this fact should be noted after the figures indicating the frequency per minute, with addition, as the case may be "shallow," "deep" or "normal." On the other hand, if it is irregular the character of the irregularity should be noted. An irregular respiration may be intermittent, remittent, sighing, "up and down" or Cheyne-Stokes in character. All these variations from the normal have considerable significance in the study of certain brain diseases. A respiration that is more frequent while the patient is asleep than it is while he is awake, points very strongly to organic disease of the brain, in the region of the respiratory centers. In a remarkable case which I studied about eighteen months ago, the first positive symptom observed on which I could base a diagnosis of organic brain disease was, while the patient was asleep the respirations were nearly twice as frequent as they were when she was awake. This case had been thought to be hysteria before I saw it, and certainly it did present a formidable array of symptoms of this disease. The patient was under my care ten or twelve weeks immediately preceding her death. On several occasions during the last weeks of life the respirations numbered 120 to 144 per minute during sleep, and 60 or 70 while the patient was aroused from a stupor. The autopsy showed, on microscopic examination, made by Dr. William M. Mitchell, a periarteritis of the smaller vessels of the pons. A very slow or a very rapid respiration in organic disease of the brain is of grave omen. It must be borne in mind that opium in non-lethal quantities may give rise to nearly all the irregularities of respiration, except possibly the Cheyne-Stokes, observed in organic brain disease. It also, in small therapeutic doses, slows the respiration.

For convenience I will repeat the principal forms of irregular respiration that I am accustomed to watch for in organic

disease of the brain. *Sterterous; intermittent; remittent; sighing; "ascending and descending;"*§ and *Cheyne-Stokes.*

Sterterous. Sterterous respiration occurs in brain lesions in which the muscles of the palate and pharynx are completely paralyzed and the palate and uvula are pushed backward and forward with each inspiration and expiration. It is always attended by coma, the reflex of the pharynx is lost and the patient is unable to swallow. If found early in brain lesions it denotes usually a profuse intracranial hemorrhage. As a rule it precedes death in all cases of death by the brain. This noisy breathing is most marked while the patient is lying on his back, and may be greatly lessened by turning him on his side.

Intermittent respiration, as its name implies, is a respiration in which a pause occurs at least equal to the time required for one entire respiration. The intermission may occur one or more times a minute. It is usually 10 or 15 seconds in length. Not infrequently, I have met with cases in which it was 20 or 25 seconds in length, and in the remarkable case to which reference has been made in which the respirations sometimes were 140 per minute while the patient was asleep or unconscious, the intermissions some days before death were two minutes in duration. Intermittency in the respiration occurs in some cases of renal and cardiac disease, from the influence of opium and probably from the effects of various other poisons on the nervous system. It is one of the early disorders of respiration in all diseases of the brain in which the respiratory centers are affected. It lends gravity to the prognosis, always precedes Cheyne-Stokes' respiration, but it is not always followed by the latter. The more frequent the intermissions and the greater their lengths the graver the prognosis.

Remittent respiration, in which the pause between respirations is longer than the normal, but does not equal the time required for one respiration, occurs from various organic and functional disturbances of the nervous system. When it results from organic disease of the brain, such as meningitis, apoplexy, abscess, the last stages of tumor, etc., it is not infrequently the

§I have also termed this "up and down" respiration.

first recognizable symptoms of interference with the respiratory centers. It has no special significance other than this. I have not been able to detect it in many cases in which intermittent and Cheyne-Stokes breathing have developed soon after.

Sighing respiration, also, occurs in various functional and organic disturbances of the central nervous system. When it is found in organic disease of the brain it certainly adds gravity to the prognosis. It seems to indicate that the ordinary involuntary respirations are not sufficient for nature's purposes, and extra efforts are needed to supply more oxygen to the blood. If it occurs it is an early symptom, and like remittent respiration, denotes some disturbance in the respiratory centers.†

"Up and down, or ascending and descending" respiration, next to the Cheyne-Stokes type of breathing, gives the greatest gravity to the prognosis in organic brain disease. I do not remember having seen this form of respiration described.§§ There is no remission or intermission, nor undue pause between the respiratory acts. The patient takes a full breath and each succeeding respiration becomes less and less until the chest or abdomen scarcely seems to move, but almost immediately without any lengthening of the natural pause there follows a respiration a little fuller than the faintest which was the last of the descending. Each subsequent respiration increases in size until a full respiration is reached, when again, without an abnormal pause the respiration begins to descend. Thus the ascending and descending respiration may continue for hours before the Cheyne-Stokes respiration develops. In some cases I have observed the

†During the preparation of this paper an adult female, a tuberculous subject for many years, began to have an occasional remittent respiration, the next day sighing and intermittent respiration was present, temperature subnormal.

§§On reference it is found that I described this form of respiration in a Report of Three Cases of Abscess of the Brain; Transactions of the College of Physicians, of Philadelphia, Pa., Third Series, Vol. VI, 1883, p. 90. I did not at that time give any name to it. I stated that one or more cases with respiration differing from the Cheyne-Stokes, similarly to that of my case had been reported by Mills & Ott in 1881. My description in 1882 is as follows: "Just before the patient's death, when respiration approached the Cheyne-Stokes character, there was no period or interval of several seconds duration, during which the respiration intermitted, but the movements were continued regularly, increasing or lessening as the efforts at respiration reached the maximum or minimum."

"up and down" respiration to appear and disappear two or three times before the Cheyne-Stokes type has developed. In a few cases the latter has not followed and the patient has recovered.

Cheyne-Stokes respiration differs only in form from the "ascending and descending" type, in the former being attended by a prolonged pause at the end of the descending respiration, and by a slighter pause at the end of the ascending respiration, but still the pause in the latter instance is greater than is observed between each normal respiration. It must be extremely rare for recovery to take place in organic brain disease after the Cheyne-Stokes type has developed, as I have witnessed only one instance and in this death was only temporarily postponed. In this case the patient was suffering from acute softening of the brain, caused by thrombotic occlusion of a large artery. For two or three weeks the patient lived with intermittent, and occasional sighing and remittent respiration, but finally the breathing assumed the ascending and descending type, followed by the Cheyne-Stokes, and death speedily took place.

Hughlings Jackson has mentioned abdominal breathing as occurring in connection with cerebral hemorrhage. He says it is a grave symptom under such circumstances.

In 1882 I reported a form of abdominal breathing noticed in the course of the history of a case of brain abscess. It may be imitated by one in health by first voluntarily expanding the abdomen, then allowing the chest to be inflated while the lower chest and abdomen are kept expanded, the expiratory movements taking place first in the abdomen and ending with the chest. This form of respiration is of grave omen, and is most commonly found in cases of great prostration, as in typhoid fever, shock, or in any brain disease attended by a similar condition of the vital forces.*

Meningitis has rarely a temperature above 102° or 103° in its earlier stage. In tubercular meningitis a temperature of 101° to 102° is the rule early in the disease, unless it is ushered in by one or more violent convulsions, when it may be 103°. In the final stage of the disease a temperature of 104° to 105° or

*Transactions College of Physicians, of Philadelphia, Pa., 1883.

even 106° denotes approaching dissolution. In some cases of tubercular meningitis with a large effusion into the lateral ventricles and running a prolonged course, a sudden rise of temperature to 105° or 106° may occur at irregular intervals, several times during the course of the disease. I reported such a case, entitled "Tubercular Cerebro-spinal Meningitis," in 1883.**

In purulent meningitis the temperature is variable. It may quickly reach 104° or 105° and continue thus elevated until just before death, when it may register 106° or even 107°. In all such cases the disease runs a rapid course. In other cases the temperature may be normal or subnormal at times, the patient dying from exhaustion with a rectal temperature 1° or 2° below normal. I have seen cases of tuberculosis of the cerebral membranes in adults suffering from tuberculosis of the lungs and melancholia with a normal or subnormal temperature until the day before death. In some of these the temperature immediately preceding death was not above 100°. In the vast majority of cases of meningitis, no matter what the cause of the inflammation may be, the temperature reaches 104°, 105° or even 106° before death, and the gradual rise of temperature in the last stage of the disease indicates that the end is near. On the other hand, a sudden rise of temperature to 105° or 106° may have no such significance. Great irregularity of temperature during the course of meningitis points to sepsis or large effusion into the lateral ventricles.

The temperature is practically the same in each axillia in meningitis, except in a few cases beginning unilaterally, as sometimes happens in syphilitic meningitis and in rare instances of tubercular meningitis apparently starting from a tubercular nodule situated on one side of the brain. I have seen one such case of the latter character attended by hemiplegia. The temperature, taken a few hours after the first Jacksonian convulsion, was nearly 2° higher in the axilla on the paralyzed side. Before death the temperature was nearly the same in each axilla.

The pulse is variable in meningitis. Its average in the beginning of the disease is about 100; later it may become exceed-

* *Ibid, p. 308.

ingly slow, dropping to 70 or even to 40 per minute and is then often very irregular, both in volume and frequency. Intermissions are of frequent occurrence, the spacing between some beats may be observed to be increased and all the beats are not of the same volume. As the end approaches and extreme exhaustion is apparent the pulse becomes frequent whether the temperature rises or not. In all cases in which the temperature is very high toward the end the pulse is 150 to 170 or 180, and finally may become uncountable. In cases in which there are sudden rises of temperature during the course of the disease the pulse becomes very frequent at these times.

The respiration, especially in regard to frequency, is less variable in meningitis than the temperature or pulse. The character of the respiration early in the disease is frequently of considerable diagnostic importance, especially in the tubercular form, in which the base of the brain is usually affected. The significant character early is the intermittent type with occasional sighs. There are irregular pauses in the respiration, several seconds in duration, during which the patient ceases to breathe. In a few cases in the adult supposed to be suffering from tubercular meningitis, the intermittent respiration has been the first positive evidence on which I could base a diagnosis. The frequency of the respiration is rarely greatly disturbed in the early portion of the developed stage of the disease. In one case of subacute tubercular meningitis there was also a periarteritis affecting the nutrient arteries of the pons and medulla and involving the respiratory centers. In this case the respiration was more rapid while the patient was asleep than while she was awake. In basilar meningitis, involving mainly the posterior fossa, and in cases in which the lateral ventricles are greatly distended the respiration may be quite slow at times, and rarely exceed the normal until the symptoms point to the beginning of the end from exhaustion. Slow respiration, with cyanosis in basilar meningitis indicates that the respiratory centers are greatly affected. It is in such cases that sudden death may occur from arrested respiration. In all cases of meningitis in which death occurs from exhaustion, respiration, like the pulse, becomes very rapid before the end. The gradual increase of the frequency of the respiration and

pulse enables one approximately to determine about when death will occur. A sudden increase in the frequency of the respiration and pulse has no such significance. It is rare for the patient to make much of a rally after Cheyne-Stokes respiration sets in. Ascending and descending respiration without abnormal pauses as seen in the Cheyne-Stokes type, may occur any time after the disease is fully developed and nearly always precedes the development of the latter.

Apoplexy due to hemorrhage is attended with greater disturbance of the temperature of the body soon after the occurrence of the stroke than is the case when the apoplexy is due to embolus or thrombus. Dr. Charles L. Dana, of New York, in 1894, reported a number of cases of apoplexy, in which he carefully studied the temperature in both axillæ and in the rectum.†† He rarely saw his cases early enough to detect the initial fall of temperature, but he observed a greater increase of the body heat and a greater difference between the temperature of each axilla soon after the occurrence of the hemorrhage than he found in apoplexy of thrombotic origin during this period. The observations of Weber, of Boston, and those of others to which he refers in his article on Hemorrhage of the Brain (Pepper's System of Medicine, Vol. V, 1883), show a greater disturbance of temperature in apoplexy from hemorrhage early in the disease than occurs during this period in apoplexy due to thrombus or embolus.

I have studied the temperature in 60 cases of apoplexy, 26 of which were due to hemorrhage, 22 to thrombi, and 12 to emboli. In a number of these the temperatures were taken within an hour or at most a few hours after the occurrence of the apoplectic stroke, or before reaction had taken place.

I have found that apoplexy caused by a large hemorrhage into the brain substance is usually attended by a temperature that is often more or less chacacteristic of the lesion, especially during the early days of the disease. Within an hour (sometimes less) there is a fall of temperature, varying from half a degree to two degrees (in one case three degrees), depending upon the size of

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††Dr. Charles L. Dana, Apoplexy in Its Relation to the Temperature of the Body, American Journal of Medical Science, June, 1894.

the hemorrhage and the shock caused by it. The initial fall of temperature lasts in the vast majority of cases only a few hours (six to twelve) or until reaction begins. Large hemorrhages into the lateral ventricles, in my experience, have caused the greatest depression of temperature. It was in a case of this character that I saw within an hour after the occurrence of the hemorrhage that the thermometer registered only 95.2°. Hemorrhages attended by hemiplegia give rise to a greater initial fall of temperature than those in which no unilateral motor disturbance occurs. I have never found an initial fall of temperature in cases of hemorrhage into the pons or medulla. In these cases the temperature apparently begins to rise soon after the occurrence of the hemorrhage and continues to do so until death, sometimes reaching 105° or 107°. In the case of a woman about 60 years old, stricken down in the Arapahoe county court house, whom I saw a few minutes after the occurrence of the hemorrhage, the temperature was 101° when I first saw her. She was immediately removed to the Arapahoe County Hospital and her case carefully studied under my supervision. Her temperature continued to rise and reached 107.2° before death, which occurred six hours after she was first taken sick. In the severest cases of introventricular hemorrhages, there is apparently no attempt at reaction and death occurs within a few hours. In the lighter cases of this character, the initial fall of temperature is about one degree, and as soon as reaction takes place (usually from eight to sixteen hours) the temperature reaches normal. By the end of the first twenty-four hours the temperature will be 100° or 101°, and as soon as the lungs begin to fill up it rapidly rises, reaching 103° to 105° before death, which usually occurs during the second or third day. The high temperature in these cases has seemed to me to be due to pulmonary complication. It will be seen that in introventricular hemorrhages, an initial fall of temperature, amounting to 2°, a failure to react or a high temperature after reaction occurs, denotes great gravity and speedy death.

In several cases of hemorrhagic apoplexy, causing complete hemiplegia, in which the blood has not found its way into the ventricles, nor the bleeding occurred in the pons or medulla, the

initial fall of temperature will vary from one-half to one degree. Immediately after reaction has occurred the temperature will be normal. During the first two or three days following the hemorrhage the temperature may vary from 2° to 3° above normal. The greater the initial depression of body heat, the slower the reaction and the higher the temperature after reaction takes place, the graver the prognosis. On the other hand, the slighter the initial depression of the body heat, the more speedy reaction occurs, the less elevated the temperature subsequently and the sooner it becomes normal the better the prognosis. In the lighter cases I have not been able to discover any initial fall of temperature, although I am inclined to believe that it is almost a universal occurrence in cases of hemorrhage into the brain substance attended by sufficient shock to render the patient unconscious. It is only occasionally that cases of apoplexy are seen early enough to detect the initial fall of temperature.

In cases of hemorrhage into the brain substance unattended by hemiplegia, but in which the shock has been sufficient to cause loss of consciousness, there may be, and probably is, an initial depression of the body heat, but I have not seen any such cases sufficiently early to study the temperature during the first few hours, after the occurrence of the hemorrhage. In cases of ingravescent apoplexy I have found the temperature slightly elevated, although I have seen only two such cases within two hours after the patient first began to complain. Exceedingly high temperatures have been observed in hemorrhagic and other lesions of the lenticular nucleus.§

In nearly all cases of hemorrhage into the brain substance in which death does not occur before reaction takes place and in which the shock has been sufficiently severe to cause loss of consciousness, the temperature immediately after the shock is recovered from is practically normal or slightly elevated (cases of hemorrhage into pons, medulla, cortex of brain, gray matter of great ganglia at base of brain, and cases of ingravescent apoplexy excepted). By the end of the first day or beginning of the second the temperature in the axilla will register one to

§Gowers: A Manual of Diseases of the Nervous System, Second Edition, Vol. II. p. 398.

three degrees above normal. After this time the temperature will begin to decline if the case is not exceedingly bad and likely to prove fatal. In the lightest cases of hemorrhage into the brain substance there is only slight variation of the temperature from the normal. If it rises at all it will reach 99° to 99.5° by the end of the first day, and return to normal by the end of the third day. The temperature in hemorrhagic apoplexy during the first few days shows a marked contrast to the temperature in apoplexy from thrombus or embolus, in which the temperature is normal the first day, infrequently rises half to one degree by the end of the second. I believe that Dana is correct in attributing the early rise of temperature in hemorrhagic apoplexy to the character of the lesion rather than to its location.*

We must make an exception to this statement in lesions of the pons and medulla in which the temperature is usually considerably elevated regardless of the character of a suddenly inflicted injury.

As the study of the early temperature in cases of apoplexy, due to hemorrhage, is important for diagnostic purposes, so is a study of the entire course of the temperature of immense value in guiding the physician in his prognosis. The higher the early temperature, the greater the brain lesion and the more unfavorable the immediate prognosis. The longer the temperature remains above normal the more unfavorable the ultimate prognosis. In the lighter cases that are attended by a slight rise of temperature, the body heat begins to decline by the second day and reaches normal a day or two later. No case can be considered out of immediate danger so long as the temperature remains two or three degrees above normal. Cases in which the temperature keeps only slightly elevated above the normal several weeks after the occurrence of the apoplectic stroke, are attended by brain irritation or inflammation and have a grave prognosis.

Apoplexy from a thrombus or an embolus is attended by only a slight variation of the temperature from the normal during the first two days. Exceptions are found in lesions of the pons and medulla. There is no perceptible initial lowering of the

*Charles L. Dana: Apoplexy in Its relation to the Temperature of the Body, American Journal of Medical Science, June, 1894.

temperature; at least, I have been unable to detect any. In the severest cases there may be a slight rise of temperature by the second day. In the vast majority of severe cases there will be a rise of temperature from the third to the fourth day. A rise of temperature at this time denotes softening. The lighter cases have no rise of temperature at any time, and the prognosis is favorable so far as life is concerned, and to a greater or less extent, for complete recovery. An elevation of two or three degrees above normal denotes extensive softening and renders the prognosis most grave. Cases in which the temperature remains above normal for weeks or months, although the temperature may not go above 99°, will probably end in death from extensive softening.

BILATERAL AXILLARY TEMPERATURES IN APOPLEXY.

For bilateral axillary temperatures to have any special significance the temperature must invariably be higher on the same side and the observations should be made by the same persons. Cases in which the axillary temperature appears higher first on one side, then on the other, the difference is usually due to the carelessness of the person who takes the temperatures. An axillary temperature that remains continuously higher on the same side has considerable importance, although the difference between the heat of the two axillæ is only half a degree.

APOPLEXY FROM HEMORRHAGE INTO THE BRAIN SUBSTANCE.

Soon after the occurrence of the hemorrhage before reaction has taken place, the axillary temperature is slightly lower, from a half to one degree, on the paralyzed side than on the normal side. The more complete the hemiplegia and the more profound the shock the greater the initial disparity of temperature. In these cases the temperature in each axilla is below normal. In cases of intracranial hemorrhage, unattended with hemiplegic symptoms, I have found no perceptible difference of temperature between the axillæ. In cases of cortical or meningeal hemorrhage, affecting the motor region, I have found from the first the temperature higher on the side of affected motility. As soon as reaction takes place in intracranial hemorrhage, causing hemiplegia, the axillary temperature is higher on the paralyzed side and remains so until the temperature becomes normal. In those

cases in which the evening temperature occasionally runs up to one or two degrees above normal weeks after the occurrence of the stroke the temprature is usually slightly higher in the axilla on the paralyzed side. In cases in which the hemiplegia remains complete after the temperature has been normal one, two or three weeks the temperature may be, especially in the worst cases, about half a degree lower in the axilla on the paralyzed side.

In apoplexy from an embolus or a thrombus attended by hemiplegia there is no perceptible difference between the axillary temperatures until softening occurs, usually the third or fourth day. In the lighter cases of embolic or thrombotic apoplexy there is no temperature disturbance at any time. In the severer cases with complete hemiplegia in which necrotic softening becomes extensive the axillary temperature on the paralyzed side will be higher than on the unaffected side from the third or fourth day until all intracerebral irritation ceases. In four fatal cases of this kind, death occurring in one at the end of two weeks, in two at the end of two months and in the fourth at the end of four months, I had the bilateral axillary temperatures taken from two to three times daily. The temperature in each was from half to one degree higher in the axilla on the paralyzed side until death. At the autopsies extensive softening was found in the affected hemispheres. In two, more than one-half of one hemisphere in each case was broken down and false cystic-like membranes were found. In cases of apoplexy due to thrombi or emboli, in which death does not occur, but in which hemiplegia remains, the axillary temperature is about half a degree lower on the paralyzed side after the second or third week. If the temperature does not become slightly lower on the paralyzed side after the second or third week and the patient remains completely hemiplegia, there are usually occasional rises of temperature in the evening. During these periods of febrile disturbance the temperature is almost invariably higher in the axilla on the paralyzed side. When a cortical vessel becomes occluded, giving rise to local or unilateral convulsions and later to paralysis, there is usually a slight rise of temperature from the first in the axilla on the side of the affected muscles over that of the normal side.

Unless extensive softening takes place the temperature is soon normal and the same in each axilla. If a recurrence of the trouble takes place or softening should become sufficient to prove fatal the temperature becomes higher on the paralyzed side and remains so until a short time before death, when the temperature is found to be the same in each axilla.

It will be observed that carefully observed bilateral axillary temperatures, are important in aiding the physician in making an early diagnosis between apoplexy due to hemorrhage and apoplexy caused by the occlusion of a vessel. A difference between the temperatures of the axillæ during the first two days is in favor of hemorrhage. A difference between the axillary temperatures that does not occur before the third or fourth day is in favor of an occluded vessel.

Bilateral axillary temperatures aid in prognosis. The greater the difference between the axillary temperatures in unilateral disturbance of motility from any cause the more unfavorable the prognosis. If the axillary temperature remains higher on the paralyzed side weeks or months after the occurrence of the hemiplegia the ultimate prognosis is extremely unfavorable.

Pulse in Apoplexy. In hemorrhagic apoplexy the pulse is often slower than normal at first. In cases with a profuse hemorrhage into the brain substance, especially when it finds its way into the lateral ventricles, the pulse is rapid from the first and continues so until death. The pulse may be nearly normal in cases with moderate size intracranial hemorrhages. The slower the pulse the first day or two after the occurrence of the apoplexy the greater the probability of hemorrhage being the cause. An irregular pulse, sometimes, develops early in apoplexy and is a cause for anxiety. A rapid and irregular pulse always lends gravity to the prognosis.

Respiration in Apoplexy. It is often nearly normal throughout the course of the disease in favorable cases. It nearly always becomes rapid before death. Any deviation from the normal in the character of the respiration is unfavorable. An intermittent, followed by an "ascending and descending" respiration lends great gravity to the prognosis. The development of Cheyne-Stokes respiration in a case almost invariably indicates

a speedy and fatal termination. Hughlings Jackson has laid considerable stress on the gravity of cases of hemorrhagic apoplexy in which abdominal breathing develops.

Alcoholism. I have not had time to look over the records of more than forty cases of alcoholism. These were cases of acute alcoholism suffering from delirium tremens or in a state of "dead drunk" from a prolonged spree in which delirium subsequently developed. Most, if not all, of them were in addition, suffering from the effects of chronic alcoholism. Not the brain alone, but the entire nervous system and other organs of the body were diseased from the prolonged abuse of alcohol. It is convenient to place this group of cases among the diseases of the brain under consideration because the results of a careful study of the temperature, pulse and respiration in acute alcoholism are essential aids in the prognosis and guide the physician in the treatment.

The temperature in acute alcoholism may vary from normal or even subnormal to 102° to 103°, and in some cases to 105°. Not infrequently when persons are brought into the hospital in a condition of "dead drunk" the temperature will be found subnormal, probably from exposure, although we know that over doses of alcohol are depressing and will lower the temperature. It is in these cases that we have to fear a subsequent high temperature, pneumonic complications and death. So long as the temperature does not exceed 100° to 101° during the progress of the treatment there is no occasion for alarm. On the other hand, a temperature of 103°, if maintained for a few days, adds greatly to the gravity of the prognosis. A temperature of 104° to 105°, maintained for a day or more, makes the case exceedingly grave, although I have seen cases recover after the temperature had reached 105°. Only in a few rapidly fatal cases have I observed a temperature of 106° or 107°.

The pulse in acute alcoholism is nearly always increased in frequency and in severe cases may be 120 per minute for days. A pulse that is intermittent in character and irregular in volume denotes a grave case. The more rapid and irregular the pulse the more unfavorable the prognosis.

The respiration is rarely very frequent unless complications develop, such as pneumonia. I have seen a few fatal cases of delirium tremens in which the respiration has been slightly increased in rapidity, then becomes intermittent and ascending and descending in type, and finally, the Cheyne-Stokes variety has preceded death. In all of these the post-mortem has revealed an intensely congested brain with some serious effusion. Such cases have a high temperature (frequently 105° or 106°) and the pulse ranges from 120 to 160. When the respirations vary from 36 to 50 per minute comparatively early in the course of the disease the chances are that pneumonic complications have developed.

Acute and fatal cases of insanity. I have had time to look up the histories of only twelve of these in which the records were kept with sufficient care to be of service in this connection. These twelve cases may be divided into three groups: Violent mania, four; agitated melancholia, six; stuporous melancholia, two.

In the four violent maniacs the temperature was nearly always slightly elevated above normal and sometimes the thermometer registered in the axilla 103°. In two pneumonia developed and the temperature went up to 104° and reached 105° before death. The other two died from exhaustion. At first the temperature ranged from 99° to 100° in the morning, and from 99.5° to 101.5° in the evening. Later the temperature descended to normal or slightly below on a few occasions, but before death it registered 103°. I have the records of more than one hundred cases of acute mania that did not end fatally, at least, before they passed from under my care to enter an asylum, and in most of these the temperature was nearly normal, except during periods of excitement, when it became slightly elevated.

The pulse and respiration do not require a detailed study here. The more rapid the pulse and respiration the greater the excitation and the subsequent exhaustion.

In melancholia a careful study of the temperature is of considerable importance. In the majority of these cases the temperature is normal or slightly below. In the agitated melancholiacs the temperature frequently rises to 101° or 102°. A temperature two or three degrees above normal maintained in

melanchoila is of the gravest omen. I have seen three cases in which the temperature ranged from 102° to 104°. They all proved rapidly fatal, only one running a course of four weeks. In all the autopsies revealed nothing beyond an intensely anemic brain. The pulse in cases of agitated melancholia was increased in frequency and the respiration varied little from the normal.

In the two fatal cases of stuporous melancholia in which I have had the opportunity to make careful and prolonged observations, the temperature has been low, at times registering 97° and on several occasions 96.5. The pulse, nearly normal in frequency at first, has become rapid as exhaustion increased. The respiration has been slower than normal early in the disease, and not till near the end did it show much increased frequency.

Tumor of the Brain in the vast majority of cases is unattended by any variations of temperature worthy of record, except in the last stages, in which a high temperature, with other grave symptoms, point to approaching dissolution. There are, however, a few cases in which occur, at regular or irregular intervals, a sudden rise of temperature that might be mistaken in supposed malarial subjects by a careless observer, for cases of profound malarial poisoning. Such mistakes have been made, but they may be easily avoided, if one is on his guard and examines the optic disks. Such sudden rises of temperature in cases of tumor of the brain with other symptoms, such as stupor, rapid pulse and respiration, suggesting, by its apparent periodic recurrence, a possible malarial origin, is probably due to pressure at the base of the brain in such a manner so as to interfere with the circulation in the veins of Galen. According to my experience all such cases due to tumor present double choked disks.

I have had the bilateral axillary temperatures taken in numerous cases of tumor of the brain, but I have been unable to obtain any constant and reliable difference between the temperatures of the axillæ even in cases of tumors involving the motor region and giving rise to hemiplegia. I have thought that a difference might be found to exist between the temperature of each axilla in cases in which the growth began in the cortex of the motor region provided the observations were made sufficiently early.

The pulse and respiration require no description in tumor of the brain. They are both practically normal until near the end of the disease, except in cases with sufficient trouble at the base of the brain (especially in the posterior fossa) to interfere with the normal action of the cardiac and respiratory centers. Anything that causes effusion into ventricles will disturb the pulse and respiration.

Abscess of the Brain presents three stages in which the temperature in each is different from that of either of the other stages. The first stage is the initial or irritative; the second, the depressive; the third, the terminal or explosive. In the first or irritative stage the temperature ranges from 101° to 103°; in the second or depressive stage, indicating the formation of an abscess the temperature drops to normal or subnormal, and only occasionally rises to 99° or a little above for a few hours; in the last or explosive stage, the temperature rises to 104°, 105° or to 106° and indicates the near approach of death.

The pulse and respiration are modified nearly alike in the different stages of abscess of the brain. In the early or irritative stage, during which there is usually some febrile reaction, the pulse and temperature are moderately increased in frequency; in the stage of depression from the influence of pus within the cranium, the pulse and respiration become greatly lessened in frequency. The pulse may be 60 or less, the respiration 16, 12, and in one case reported by Bramwell 4 per minute. During the explosive or terminal stage the pulse and respiration may become very frequent, especially just before death occurs.

I was in hopes at one time that I should be able to obtain some useful information from a careful study of the bilateral axillary temperatures in abscess of the brain. I have been disappointed in this, principally, I think, because abscess of the brain is so infrequently attended with paralysis early in its course.

Traumatism of the brain for the purposes of a clinical study of the temperature, pulse and respiration may be divided into three stages, the second and third of which may never be reached. In the severer cases death occurs before the second stage develops. In the lighter cases the injury may not be grave enough, although

convalescence may be prolonged, to cause the development of the second and third stages. In the first stage we have the immediate effects of the injury. These are shock; often fracture with or without depression of bone; intracranial hemorrhage, or not infrequently hemorrhages from several bleeding vessels at different points within the cranial cavity; diffuse or limited contusion of the brain and its membranes; finally laceration of the brain, and much less frequently of its membranes. Simple concussion of the brain may *possibly* occur without any change in the intracranial structures, but during an active practice extending over more than a quarter of a century, during which I have seen several hundred head injuries of all descriptions, I have not met with a single case that appeared typical of concussion.

It is rare for inflammation, which is usually of microbic origin, of the brain or its membranes to develop before the third or fourth day after the receipt of the injury. Therefore, by the third or the fourth day, traumata of the intracranial structures may be followed by secondary inflammation. Such an occurrence may be termed the beginning of the second stage.

Suppuration or abscess of the intracranial structures, especially of the deeper portions of the brain, rarely takes place as the result of an injury to the head before the middle or end of the second week. The development of suppuration, if it does take place, marks the beginning of the third stage and the termination of the inflammatory or second. Fortunately with strict antisepsis and asepsis suppuration is of comparatively infrequent occurrence if the patient is seen by a competent surgeon before the intracranial structures have become infected.

Will a careful study of an accurate record of the temperature, pulse and respiration aid us in the diagnosis and prognosis of cases during any or all of the three stages?

This question is much more difficult to answer intelligently and satisfactorily than what it at first seems, especially on analyzing the records of a few cases, or certain more or less definite classes of cases. After carefully studying and comparing the detailed records of my eighty-eight cases, some extending over periods of hours, some over days and others extending over periods of weeks or months, in which the temperature, pulse and

respiration were recorded every few hours, both day and night, I find it impossible to arrive at definite conclusions. The results of injuries to the intracranial structures are so variable and concomitant conditions so numerous that after one has formulated in his own mind certain rules to guide him in the diagnosis of this class of cases he finds on subsequent observations cases that upset all his preconceived opinions in regard to the temperature, pulse and respiration. This apology seems necessary in this connection for what I now say, I may wish in the future had been left unsaid. Besides my own cases, I have carefully studied most of the cases recorded by Charles Phelps, M. D., in his excellent work entitled 'Traumatic Injuries of the Brain and Its Membranes." In this book he gives condensed histories of 300 cases, together with the results of the autopsies in 225 of them. The entire work is of such character as to entitle him to a debt of gratitude from the medical profession.

When we come to study the temperature of traumatic injuries of the intracranial structures, especially soon after the receipt of the traumata, we must bear in mind that shock and hemorrhage have a tendency at first to lower the temperature and laceration and contusion of the brain and its membranes usually cause a slight rise of temperature. All these different conditions are frequently found in the same patient at the same time.

I have seen no cases of traumatism of the brain within four hours after the receipt of the injury and most of the cases have been first seen by me several hours later. In eighty-seven of the eighty-eight cases the temperature was normal or slightly above normal a few hours after the head injury. In the one exception the temperature was 97° and the patient died within a few hours. The autopsy revealed an enormous epidural hemorrhage covering most of the convex surface of the brain. In twelve cases the temperature was practically normal as it varied in the different cases from 98.2° to 98.6°. In all of these cases, seen within a few hours after the injuries had occurred, the temperature became elevated subsequently. In the remaining seventy-five cases the temperature ranged from 99° to 101° at the time of my first seeing them, with two exceptions in which the temperatures were 102° and 103° respectively within four hours

after the injury and the temperature in each went to 105° before death, which occurred in one case four hours and in the other six hours after I had first seen them. In each there was hemorrhage in the posterior fossa with fracture of the bone and contusion of the soft structures around the pons and the medulla.* In thirteen of thirty-nine cases studied in regard to temperature on admission to the hospital by Dr. Phelps, the body heat was found to be subnormal. In the eighty-eight cases of which I have records only one had a subnormal temperature a few hours after the occurrence of the accident. This discrepancy may be accounted for from the fact that, as a rule, I only see those cases in which the surgeon desires the assistance of a neurologist. Most of those cases that prove rapidly fatal I have not had an opportunity to study. In the three cases which proved fatal within a very few hours, one with a subnormal and the other two with high temperatures, the pulse in each on admission was rapid, weak and intermittent. The respiration in the case with the subnormal temperature at first was nearly normal in frequency, but it was stertorous. Before death it became very rapid, registering 64 per minute. In the two with high temperatures and injuries around the pons and medulla with considerable hemorrhage at the base, but not surrounding the pons and medulla, the respiration was at first slow, from 8 to 10 per minute, and very intermittent. Some of the intermissions were 20 seconds in length. In neither case did death occur suddenly, but from profound shock and exhaustion of the respiratory and cardiac centers. The respiration became exceedingly rapid before death. In one the nurse recorded 72 and in the other 78 respirations half an hour before death, per minute. In many of those cases that prove suddenly fatal from injuries in the region of the pons, especially from large quantities of fluid blood surrounding the pons and medulla, respiration is infrequent at first and becomes more and more infrequent until death occurs. Phelps has recorded thirteen such cases.†

The pulse and respiration of most of the eighty-eight cases were nearly normal at the time I first saw the patients. In those

*In all the traumatic cases the temperature was taken in the axilla.

†loc. cit. pp. 100 and 101.

in which shock was playing a very important part the pulse was rapid. In some cases with large hemorrhages the pulse was slow, otherwise it presented nothing worthy of record. Respiration is less affected than the pulse from traumatism. In cases with large hemorrhages and in lesions around the pons or medulla the respirations were slow in the first instance, and slow and intermittent in the second.

To facilitate the study and analysis of the eighty-eight cases mentioned in this paper, with a view to utilize the study of the temperature, pulse and respiration, it is convenient further to divide the cases into five groups, as follows:

1. *Cases that proved fatal during the first stage, from shock, hemorrhage, injuries to the brain and its membranes, death taking place from exhaustion without the apparent occurence of septic inflammation, 14. Death took place in all these cases within a few hours to a few days.*

2. *Cases that recovered without any apparent septic inflammation, 42.*

3. *Cases that went through the first and second stages (traumatic and inflammatory) and recovered without the formation of an abscess, 16.*

4. *Cases that passed through the first and second stages (traumatic and inflammatory) and died exhausted from sepsis without the formation of an abscess, 7.*

5. *Cases that developed abscess of the brain, 2, and others that developed abscess of the membranes and suppuration of the adjacent brain surface, 9.*

Group 1. Of this group I have already given the records and termination of three cases. Of the remaining eleven, five were so desperate that no operation for their relief was attempted, and they all died within thirty-six hours. The temperature rapidly rose and reached from 103° to 104°, and in two 105° before death. The pulse increased in frequency as the temperature ascended, and became exceedingly rapid before death. Respiration in two varied from 24 to 28 within twelve hours after the patient had been admitted to the hospital. In three it was slow and intermittent until exhaustion became well marked, when it increased in frequency. In all there was fracture, bruising of the

intracranial structures and hemmorrhage. In the three with slow and intermittent respiration the fracture and bleeding had occurred at the base. In the other two at the vault. In six the condition did not seem quite so desperate as in the others of this group, although the temperature was rising and the pulse and respiration becoming more frequent at the time of the operation. In two there was a depressed fracture of the skull, extending from just above the orbit backward toward the ear. In four there was no apparent fracture, but localizing symptoms on one side of the brain. Operation revealed a linear fracture extending to the base of the skull in all. The temperature was depressed by the operation to nearly normal in most of the cases, but the pulse was increased in frequency and lessened in strength by it. As soon as reaction from the operation took place the temperature began to rise and the respiration and pulse to increase in frequency. Before death which took place in all the cases within three days after the operation the temperature varied from 102° to 103°. the pulse from 100 to 150, and the respiration from 24 to 40. Autopsies on four of these cases besides fracture revealed hemorrhage at the base and injury to the membranes and brain. On the other two no post-martem examination was obtained, but from the character of the symptoms it is more than probable that the same conditions existed in these also.

Group 2. *Cases that recovered without any apparent septic inflammation, 42.*

a. Strong evidence of fracture, hemorrhage and probably contusion at brain base in 14.

b. Evidence of contusion of the brain without apparent fracture or localizing symptoms in 16.

c. Evidence of depressed fracture in 8.

d. Localizing symptoms without apparent fracture in 4.

In sub-group "a" the surgeon did not attempt to enter the cranial cavity. The temperature varied from 99° to 100°, sometimes 100.5° for four or five days and then beame normal or slightly sub-normal in the morning and rarely going above 99°, sometimes to 99.5° in the evening. The pulse varied from 48 to 66. Infrequently, apparently from gastro-intestinal trouble, the pulse reached 72 or 80 for a few hours at a time. It was regular

and of good quality. Respiration varied from 20 to 28, but most of the time it was about 22 per minute. On a few occasions the respiration was slightly disturbed in its rhythm, becoming for a time slightly intermittent or sighing. Temperature, pulse and respiration were practically normal after the end of the first week, although the length of convalescence extended over periods varying from two or three weeks to six or eight.

In sub-group "b" the cranial cavity was not opened. The temperature varied from 99° to 101° for a week to ten days and even subsequently to this the temperature would rise from half to one degree on the slightest irritation. The pulse varied from 70 to 80, sometimes reaching 90 to 100 on slight provocations. The respiration was less disturbed than the pulse and temperature. It rarely varied much from the normal. Convalescence was often prolonged in these cases. The temperature, although practically normal a week or ten days after the occurrence of the injury, it would become elevated a degree or more weeks subsequently without any appreciable cause. The pulse would increase in frequency when the temperature rose.

In the sub-groups "c" and "d", twelve cases, the cranial cavity was opened in each instance. The temperature, pulse and respiration varied less from the normal than in sub-group "a" and "b".

Group 3. Cases that went through the first and second stages (traumatic and inflammatory), and recovered without the formation of an abscess, (16). In two of this group there was a direct communication established by means of a fracture between the brain and cavity of the nose. In four the fracture had probably established a communication between the middle ear and the cavity of the brain. In ten there were compound fractures, extensive lacerations of the scalp and contusion of the brain and its membranes, so that it is quite probable that the wound became infected before the surgeon saw the cases. So far as could be determined there were no fractures or hemorrhages at the brain base in these cases. In four of the ten cases considerable brain substance was lost.

In all of the sixteen cases surgical operations were necessary and were skillfully performed.

There was a slight lowering of the temperature immediately following the operation. In those that required several hours for the temperature to reach the normal and manifested but little power of reaction for the next few days, did the worst. Those in which the temperature was elevated to 99.5° to 100.5° within twenty-four hours after the operation did the best. The beginning of the stage of secondary septic inflammation was indicated by a difference in the morning and evening temperatures of about one degree. The pulse was frequently quite rapid after the operation, depending, of course, upon the amount of the prostration. It varied from 80 to 90 during the stage of inflammation and was often irregular. Respiration remained practically normal.

Group 4. *Cases that passed through the first and second stages (traumatic and inflammatory) and died exhausted from sepsis without the formation of an abscess, (7).*

The temperature, pulse and respiration differed in this group of cases from those in Group 3, only in denoting greater exhaustion. The temperature became more variable, the fluctuations being greater from the normal; the pulse became weaker and more rapid, but the respirations often remained normal or subnormal to the last. These cases rarely run a long course. In some of them especially in which the respiration remained slow and intermittent throughout the course of the disease, considerable hemorrhage was found at the base of the brain at the autopsies.

In Group 5 there were two cases that developed absecess deep in the brain substance, one fatal. There were seven with local suppuration involving the cortical substance of the brain and membranes in the immediate site of the external wound. Three proved fatal from a general suppurative meningitis and four recovered.

The formation of the abscesses in the brain substance were attended by low temperature, 97° to 99°, slow pulse, 60 to 70, and infrequent respiration, 12 to 16.

In the cases of local suppuration at the seat of the wound, the temperature lessened, but continued to vary considerably between the evening and the morning; the pulse was weak and often rapid

and sometimes intermittent, or showed other deviations from the normal. The respiration remained slow, but showed, at times, marked intermissions.

In the three cases of general suppurative meningitis, the temperature rose to 103, and the pulse and respiration became quite frequent.

For the convenience of a brief study of this paper the following conclusion may be added:

1. That by a careful study of the temperature, pulse and respiration much valuable information that will aid us in the diagnosis and prognosis in certain diseases of the brain can be obtained.

2. Much care must be exercised and considerable time and patience are required on the part of the physician in obtaining reliable records.

3. Nurses are totally incompetent for such detailed work, unless they have been especially drilled for it.

4. A change in the character of the respiration, rather than in its frequency is sometimes one of the first positive symptoms of organic interacranial disease, especially of tubercular meningitis.

5. A respiration that is more frequent while the patient is asleep or unconscious than it is during the waking or conscious moments is very strong evidence of organic disease of the brain so situated as to interfere with the respiratory centers.

6. Apoplexy due to hemorrhage is attended with greater disturbance of the temperature of the body soon after the occurrence of the stroke than is the case when the apoplexy is due to thrombus or embolus. The temperature disturbances in apoplexy due to hemorrhage, especially with hemiplegia are, a slight fall of the axillary heat within an hour or less after the occurrence of the hemorrhage, the fall being a little greater on the paralyzed side; after reaction has occured (eight to twelve hours on the average) a slight rise of temperature, a little greater on the paralized than on the opposite side; an elevation of temperature from half to 2° or 3° above normal for the next few days, temperature remaining a little higher on the paralyzed than on the unaffected side for a week or more (in cases of complete hemi-

plegia) later, temperature slightly lower on paralyzed side if trophic disturbances occur.

7. In apoplexy from thrombus or embolus, there is scarcely an appreciable disturbance of temperature before the end of the second day, except in the severer cases. In these cases it is slight. In the majority of cases of apoplexy from thrombi or emboli there is no marked variation of temperature from the normal at any time, so that disturbance of the temperature the first day points very strongly to hemorrhage as the cause.

8. Considerable disturbance of temperature, beginning from the second to the fourth day, is significant of thrombus or embolus and indicates extensive softening, and an unfavorable prognosis.

9. If the temperature on the paralyzed side remains higher than on the opposite side several weeks after the occurrence of the apoplexy from any cause, it indicates that softening or inflammation of the brain is going on, and lends great gravity to the prognosis.

10. It is premature to attempt to arrive at any definite conclusions from a study of the temperature, pulse and respiration in traumatism of the brain. This class of cases on account of their great importance deserves a more detailed study of all their symptoms. It is probable if cases of traumatism of the brain were classified and grouped according to the severity of the injuries and the character of the symptoms, that a careful comparison of the temperature, pulse and respiration would lead to important conclusions.

In regard to the traumatic class of cases it seems that we are justified in making the following tentative statements:

a. That all cases of injuries to the head in which the temperature does not reach normal or slightly above a few hours after the receipt of the traumata will likely prove rapidly fatal. The higher the temperature the greater the probability is that contusion or laceration of the brain and membranes is playing a more important factor in the case than in intra-cranial hemorrhage. The greater the variation of the temperature from normal, either above or below, the worse the prognosis.

b. A rapid, weak and intermittent or irregular pulse denotes great danger. A pulse that is at first slow, but soon after becomes quite rapid, indicates that brain power is being overwhelmed by the intra-cranial lesion and justifies a bad prognosis.

c. An exceedingly slow (8 or 10 per minute) and intermittent respiration indicates a lesion at the base in the posterior fossa. The slower and the more pronounced the intermission of the respiration the greater is the danger of sudden death. A respiration, at first nearly normal in frequency, but soon after becomes quite rapid, indicates a rapidly fatal case.

DISCUSSION.

Dr. Rothwell: Dr. Eskridge has referred more particularly to the disturbances of the temperature and respiration in organic diseases of the brain. I wish to emphasize in particular the pathological physiology of the circulatory changes resulting from organic affections of the brain. You are familiar with the nerves which regulate the movements of the heart, but in order to make my point clear it is necessary to recall their physiological action. The inhibitory nerve which controls and regulates the rate of the heart beats has its centre in the medulla. Irritation of this center slows the pulse because increased impulses are sent down to the heart through this nerve, holding as it were a tighter rein over its movements. The point I wish to make here is this. In the early stages of brain diseases, whether inflammatory or causing slight pressure the lesion is irritative in character, and, therefore, the pulse is slow. We find a slow pulse in the early stages of all forms of meningeal inflammation. In beginning tumor of the brain also, as long as the pressure merely causes irritation of this centre the pulse is slow.

My next point is that when any of these lesions advance from the stage of irritation of the centre to that of impairment or destruction, the pulse rate increases in a direct ratio to the damage. The inhibitory nerves lose their control over the heart, and the sympathetic or acceleratory nerves having full sway, spur the heart to a high rate of speed. This is the reason of the

frequent pulse in the advanced stages of cerebral tumor and meningitis.

Dr. McDowell: When I was House Physician to the Good Samaritan Hospital in Cincinnati, a man was brought in who had been injured in a railroad wreck a few hours before. At first I was inclined to believe him a malingerer, but in the course of about three hours from the time of his admission I found that he was becoming gradually paralyzed from his feet upwards to the region of the cervical vertebra, evidence as was afterwards corroborated by post mortem that it was the result of compression on the cord of a ruptured vessel. The temperature in this case slowly increased until just prior to death when it was 107 1-2 or 108.

Dr. Eskridge: I am sorry that I was misunderstood as I had laid as great stress upon the pulse as I had upon the temperature and respiration. Evidently Dr. Rothwell did not understand me so; else he would not have limited his remarks entirely to the pulse.

In regard to Dr. McDowell's question why it was that the temperature rose to such a high degree in certain cases of injuries of the spine as in the case reported by him where the cervical dorsal region was affected. He desired to say that no one had probably determined positively what the cause was, but it was evident to his mind that it was of vaso-motor origin. Excessively high temperature from injuries of the upper portion of the spine are exceptional. Dr. Teale, of England, some years ago put on record a case of a young lady who was thrown from her horse to the ground and injured the upper portion of her spine. In this case for several days the temperature remained at 122°. It is well known that the cilio-spinal ganglia when injured caused the rise of temperature in the neck and face. If the ganglion or one side of the spine was injured, this caused unilateral rise of temperature.

REPORT OF THE COMMITTEE ON HISTORY OF MEDICINE IN COLORADO.

The question whether the meaning, purport and duties of the committee on history of medicine in Colorado were to present before this society at this meeting a history of medicine in Colorado in several volumes, all ready for the printer, or that this committee should endeavor to find out means and ways whereby the future work of the historian of medicine in Colorado should be made more efficient, has been thoroughly discussed by your committee. After due deliberation, the mission of the committee on history of medicine in Colorado has been interpreted to be "the gathering of such data, records and historical material relating to the practice and practitioners of medicine in Colorado as might be utilized by the future historian." Your committee has accordingly sought to obtain reliable data and information, and to create a literature on the following heads:

1. BIOGRAPHICAL SKETCHES. (a) Medical Pioneers of Colorado. (b) Organizers of the Earliest Medical Societies, Colleges, Hospitals, etc. (c) Founders of Medical Periodicals. (d) Men Who Have Taken a Prominent Part in the Upbuilding of the Commonwealth of Colorado.
2. MEDICAL INSTITUTIONS. Historical Sketches of the Origin, Growth and Development of (a) Hospitals, (b) Asylums, (c) Homes, (d) Sanitaria, (e) Dispensaries, etc., in Colorado.
3. MEDICAL SOCIETIES. Historical Sketches of (a) County, State and Other Medical Societies, (b) Medical Societies for Social Purposes, (c) Medical Libraries, (d) State and City Boards of Health, (e) State Board of Medical Examiners.
4. TEACHING OF MEDICINE AND ALLIED SCIENCES. (a) Medical Colleges, (b) Dental Colleges, (c) Pharmaceutical Colleges, (d) Veterinary Colleges, (e) Institutions Wherein Biology, Psychology, Botany, Zoology, etc., are Taught, (f) Sketches of the Early Teachers of Medicine,

Surgery and the Specialties, Their Lives and Their Work.

5. MEDICAL LITERATURE. (a) Medical Books and Periodicals Published in Colorado, (b) Contribution to Periodical Medical Literature by Colorado Physicians Published Outside of Colorado, (c) Books, Monographs, etc., Published by Colorado Physicians Outside of Colorado.
6. MEDICAL AND SANITARY LAWS. (a) State and City Laws Relating to the Practice of Medicine, Sanitation, Quarantine, etc., (b) History of the Medical Bills Presented Before the Legislature of Colorado.
7. HEALTH REPORTS.
8. MINERAL SPRINGS.
9. BIBLIOGRAPHY OF MEDICINE IN COLORADO. (a) Early Newspapers, (b) Directories, Registers, etc., (c) Histories of Colorado, (d) Statutes, City Ordinances, State Archives, Court Proceedings, etc., (e) Medical Periodicals.

The interest shown in the work of your committee and the ready and hearty co-operation offered by the members of the profession throughout the state, was a source of great satisfaction to the committee, and served as an incentive to undertake the task, to which, at first, the committee thought it was not equal. The fourteen papers which will be presented before you to-day will give you an idea of the valuable historical material which the members of the profession are capable of unearthing in the future, and that there are Johnsons, Motleys, Greens and Bancrofts in our midst. The committee has in its possession many more valuable papers on various topics, which, for various reasons, could not be presented before this meeting of the society.

The committee respectfully recommends that the society should appoint a committee on history of medicine in Colorado for the ensuing year, so that this year's work may be continued uninterruptedly.

The committee takes the opportunity of thanking all the members of the profession in Colorado for their encouragement and co-operation, and wish to especially mention the president

of this society, who, throughout the year, took a deep interest in the work of the committee.

C. D. SPIVAK, Chairman,
EDWARD JACKSON,
RUSSELL B. FREEMAN,
E. W. STEVENS.

THE HISTORY OF THE PIONEERS IN MEDICINE IN LAKE COUNTY.

BY SOL. G. KAHN, M. D., LEADVILLE, COLO.

The history of the pioneers in medicine in Leadville and its vicinity dates from the boom of '79, which reached its climax in 1880. Although mining was carried on in California Gulch from the spring of 1860, and at one time there were over five thousand people living in the gulch, very little is known of the people of that time, and the record of only one physician was obtainable. Dr. Henry H. Hewett, who was a combination, miner, doctor, Deputy U. S. Marshall and Deputy Provost Marshall for Colorado Territory, and when the practice of medicine was a little light, would devote his time and energies to pursuing horse thieves, deserters and Indians. Dr. Hewett lived in California Gulch from 1863 to 1866, he then considered the camp played out, folded his tent, and moved to Georgetown where he engaged in mining with some degree of success. In 1869 he attended a course of lectures in Eclectic School of Cincinnati, after which he located in Denver, where he practiced until April, 1878, when the Leadville excitement once more attracted his attention. He returned to Leadville and remained from that time until the early eighties, when he moved to Aspen and was injured by the upsetting of a stage between Aspen and Glenwood Springs, was taken to Denver where he died from the effects of the injury. Dr. Hewett was the first County Physician appointed for Lake County.

In 1877 lode mining was carried on by some of the California Gulch miners. H. A. W. Tabor grub-staked two Pittsburg shoemakers, August Rische and a man by the name of Hook; they discovered ore, and from this small beginning was developed the once fomous Little Pittsburg Mine. George Fryer and "Chicken" Bill Lovell found ore in the "New Discovery." This started one of the greatest mining camps of the world.

The news spread rather slowly to the outside world. Transportation was carried on by freighters only, and the people living in the near-by settlements were naturally first apprised of the great find; Fairplay being the nearest of these, its population diminished very rapidly, and one beautiful morning in early May of 1877, one lonely doctor migrated from there and was seen wending his way over Mosquito Pass to the New Eldorado in search of gold, and it has been said that his search was not in vain. This was the first doctor to locate in what is now known as Leadville. He is our friend, Dr. John Law, who is still in active practice in the city. Dr. Law has been closely allied with everything pertaining to the practice of medicine from the incipiency of the town to the present time. He acted as Coroner of Lake County in its early days, (when pickings were good) and filed the offices of County and City Physician for over ten years, and was on the staff of the G. A. R. Hospital, one of the first institutions of its kind in Leadville. He was also one of the founders of St. Luke's Hospital, which is still owned and controlled by him.

In 1877 and 1878, the men of pills and pellets, as well as those of other callings, came straggling into the new mining camp. The second physician who was lured here by the tales of the great find was Dr. J. Ernest Meire, who came to Leadville from Georgetown in the spring of '78. He was prominent in the medical profession of this locality, having been the first City Physician of Leadville, and occupied many positions of responsibility during his residence in this community. The Cripple Creek fever attacked him in the fall of '96, when he migrated to that district, where he still resides.

From this time on it is impossible to ascertain the rotation in which the physicians appeared. The town had a mushroom

growth, and the setting sun would disclose only a few doctors' signs, when the rising sun the following morning would show many additions. As near as can be learned, the third physician to locate here was Dr. Azor A. Smith, who came to Leadville in 1878, practiced medicine until appointed Postmaster in the fall of the same year. At the expiration of his term of office, he resumed the practice of medicine, which he continued until 1892, when he located in Anaconda, where politics again claimed him and he was elected Justice of the Peace. We last hear of him as a citizen of Baxter Springs, Kansas, where he is engaged in the drug business, which he appears to find more profitable than practicing medicine in Colorado.

Prominent among the early practitioners of this district were Doctors D. H. Dougan, J. H. Heron, W. N. Burdick, F. F. D'Avignon, O. H. Simons, J. J. Crook, Addison Hawkins, A. W. Eyer and A. C. and A. M. Maclean. Only three of these are today residents of Leadville; namely, J. H. Heron, A. M. Maclean and J. J. Crook. The majority are now reaping the harvest of their early labors. Some have abandoned the practice of medicine and are following other vocations. Only one of the above mentioned, Dr. F. F. D'Avignon, has joined the silent majority.

HOSPITALS.—St. Vincent's Hospital, the first hospital of Leadville, was planned and built by the Rev. Henry Robinson assisted by Dr. John Law. Its doors were first opened in March, 1879, with accommodations for twenty-five patients. The hospital had no staff at that time. Any physician was privileged to take a patient to the hospital. The County and City patients were treated there. The first physician to be connected with the hospital in an official capacity was Dr. J. H. Heron, who was appointed in the fall of 1879. The hospital has been added to from time to time. To-day it accommodates seventy-five patients. The original building and several additions were of wood. In the past twelve months a fine brick and stone structure with modern equipments has been built, testifying to the growth and necessities of the town.

The Union Veteran Association, of Leadville, was a body of men composed of ex-Union soldiers and sailors of the civil war,

and such persons as were connected with the army in other than a military capacity. They were banded together for the purpose of rendering assistance to one another, and old soldiers and sailors in general. The hospital facilities of the town being rather meager, the idea of a hospital and home for the exclusive use of sick and invalid soldiers was concieved. A grant of 160 acres of ground had been given the association by Act of Congress in 1879 for cemetery purposes on condition that it be used for this purpose only. A hospital was built upon this ground in 1880 with a capacity for thirty patients and was supplied with, at that time, modern conveniences. The hospital was continued as such until the organization of the G. A. R. in 1881, when in November of that year, James A. Garfield Post was started in Leadville, and the Union Veteran Hospital was transferred to that organization and the name changed to the G. A. R. Hospital. It was discontinued in 1885. During the existence of the hospital, all the physicians belonging to the association were elected to the staff, which consisted of Drs. Robert McDonald, J. C. Whitehill, O. H. Simons, G. H. Moulton and J. J. Crook.

St. Luke's Hospital, of Leadville, was originated and owned by four physicians of the city, namely: Drs. John Law, Oliver H. Simons, S. Arthur Bosanko and Alexander C. MaClean. Its doors were first thrown open in March, 1885, with a capacity for thirty patients. The hospital has continued to flourish and has from time to time been remodeled and enlarged. Some time ago a fine operating room was added, and it is to-day one of the recognized institutions of the city. Another hospital of small capacity was in existence a short time in 1879 and 1880, known as the Ladies' Relief Hospital, but it is difficult to learn at this date who organized it or by whom it was controlled.

The Medical Society of the county and district is known as the Lake County Medical Association. It was organized December 30, 1880, with Dr. H. Steinau as the first president. Nineteen physicians signed the charter list, ten of whom are known to the writer, and retain interests of some kind in our city. Only four are yet members, three being active: Drs. John Law, J. J. Crook and J. H. Heron, and one Dr. D. H. Dougan has been placed upon the honorary membership list. The society does not

hold regular meetings at present, but at times is very active. It frequently lies dormant for a few months, until something occurs to infuse new energy into the slumbering organization, when it will again flourish for an indefinite period. Its present membership is twenty. The society has done some excellent work and will, no doubt, continue to exert a beneficial influence over the medical fraternity of the community.

A SKETCH OF THE WORKERS IN PHYSIOLOGY IN COLORADO.

BY C. B. VAN ZANT, M. D., DENVER, COLO.

While rightly styled the "romance" of medicine, physiology has been accorded, from the very beginning of medical education in Colorado, a place in our schools commensurate with its great and fundamental importance. Some of Colorado's best educators, for periods longer or shorter, have devoted their time and thought to this interesting field of work. It is true, they were at first handicapped by meager facilities, poor laboratories and defective means of illustration; but as the years have gone on, the work has taken a broader scope and been pressed home by better methods and more practical equipment. More time is being given to vivisections and to laboratory work. Money is being freely spent on these workshops of physiological science; and while much remains to be accomplished, as judged by the standard of large Eastern institutions, still much progress is to be recorded, in all of our medical schools, in this department of study.

Taking up the medical schools of Colorado, one by one, we find that the Denver University Medical Department (now the Denver College of Medicine), from its inception in 1881 on through the session of 1883-1884, had, as its first professor of physiology, Dr. J. H. Kimball, now of Greenwood, Mass. From that time to the session of 1889-1890, inclusive, the chair was

acceptably filled by Prof. E. J. A. Rogers, of this city. Since that date it has been occupied by its present able incumbent, Prof. Henry Sewall, who came to Denver with more than a national reputation in this, his chosen field—a reputation which has been amply sustained during a residence of many years in our midst. The most notable production of Prof. Sewall's pen, since his coming to Colorado, is his elaborate contribution on the special senses in the American Text-Book of Physiology. In this article he has brought laurels to his own brow as well as honor to his adopted state.

Dr. J. H. Kimball was born in 1844; received a high school education and graduated in medicine at the Harvard Medical School in 1867; was vice president of the Florida State Medical Association in 1879; came to Denver in 1880; was made secretary of the faculty, and professor of neurology about 1882, in the University of Denver. Between 1884 and 1887 held the following positions at the State University: Professor of physiology, of materia medica and therapeutics, and of principles and practice of medicine; was also president of Denver Medical Association and surgeon of First Colorado Regiment in the early eighties. For the past five years has resided and practiced in Greenwood, Mass.

Edmund J. A. Rogers, M. D., succeeded Dr. Kimball in the chair of physiology in the Denver Medical College in 1884.

Dr. Rogers was born in Grafton, Ontario, Canada, in 1852. He was educated as a surveyor and civil engineer, and as such was in Colorado in 1874, 1875 and 1876. During that time he assisted in laying out additions which are now part of the City of Denver. He also at that time became interested in wool growing in Colorado and New Mexico. In 1877 he passed the Ontario medical matriculation and entered McGill University as a medical student. During the greater part of his four years' residence in Montreal he acted as the assistant of Dr. Osler, who was then professor of the Institutes of Medicine (physiology and pathology) in that university. During the last two years he was also the assistant, both in hospital and private work, of the late Dr. Fenwick, the professor of surgery.

After graduating at McGill in 1881, Dr. Rogers went to Edinburgh, where he passed the examination of the Royal College of Physicians and of the Royal College of Surgeons, and registered as a practitioner there. He began practicing medicine in Denver in the winter of 1881 and 1882. In 1883 he entered into partnership with Dr. Bancroft, and assisted in the organization of the medical department of the Denver & Rio Grande Railway. From 1885 to 1890 he was associated with Dr. Blickensderfer in practice.

During the first year of his residence in Denver, Dr. Rogers was appointed on the staff of St. Luke's Hospital, and his association with this hospital has been constant since that time, he having been president of the staff since 1891.

For three years previous to the organization of the staff of the Arapahoe County Hospital, Dr. Rogers gave regular clinical instruction there to all medical students, these being the only regular hospital clinics given in Denver at that time.

Before the organization of the staff in 1890 he was appointed surgeon and served annually in that department until the present year, having been dropped for political reasons in 1900.

On the opening of St. Anthony's Hospital, Dr. Rogers was appointed by the hospital authorities chairman of its staff, but only served for one year. Upon the resignation of Dr. Davis from the chair of surgery in the Denver College of Medicine in 1891, Dr. Rogers was appointed his successor, and still holds that position.

In physiology, Dr. Rogers' instruction was almost entirely didactic, and during the latter years of his tenure of the chair he was assisted in the lectures and recitations by Dr. Lyman. Upon the arrival of Dr. Sewall in Denver, the chair was gladly relinquished to him, as being the one qualified in that work.

Dr. Rogers was president of the Arahapoe County Medical Society in 1887, of the Colorado State Medical Society in 1893. He was appointed by Governors Routt, Waite and Adams on the Colorado State Board of Health, from which he voluntarily resigned in 1899. He is a member of the American Medical

Association, British Medical Association, American Climatological Association, and of various local societies.

Prof. Henry Sewall was born May 25, 1855, in Winchester, Va. Most of his boyhood was spent in Baltimore, Md. Graduated with B. S. from Wesleyan University, Middletown, Conn., in 1876; assistant in biology, Johns Hopkins University, 1876-1878; fellow in biology, Johns Hopkins, 1878-1879; took degree of Ph. D. at Johns Hopkins in 1879; then pursued research work in the laboratories of Foster, in Cambridge; of Ludwig, in Leipsig, and of Kühne, in Heidelberg, during 1879 and 1880; associate in biology, Johns Hopkins, 1880-1881; made professor of physiology in the University of Michigan, 1882-1889; received an honorary M. D. from University of Michigan in 1888; graduated from University of Denver Medical Department in 1889; became a post-graduate student of Johns Hopkins Hospital in 1889; was appointed professor of physiology in Medical Department of University of Denver in 1890, which chair he still fills; was assistant health commissioner of Denver from 1891-1893; was secretary of the Colorado State Board of Health from 1893 to 1899. Dr. Sewall is at present a member of the American Physiological Society, Association of American Physicians, Colorado State Medical Society, and the Denver and Arapahoe County Medical Society.

When the Medical Department of the State University was organized in 1883, the chair of physiology was intrusted to Prof. J. H. Kimball, of Denver, who held the same position in the Denver University School. He was succeeded in 1885 by Prof. Luman M. Giffin, of Boulder, who filled the position with much credit till 1897, when he relinquished it for other medical work. From that date the chair has been occupied by the present teacher, Prof. E. B. Queal, of Boulder. Of these workers, the following brief sketches are appended:

Prof. L. M. Giffin was born in Heuvelton, N. Y., October 30, 1850; attended the district school and later the academic department of the Black River Academy, of Ludlow, Vt.; took his first course of medical lectures at the Medical Department of the University of Vermont; then two years at Rush, Chicago, where he graduated in 1875. Practiced six years at Rossie, N. Y.

He then moved to Boulder, Colo., where he has since practiced; was appointed to the chair of anatomy and physiology, in the State Medical School, in 1885; has held the chair of anatomy ever since, resigning that of physiology in 1897, to take up the work in physical diagnosis; has been treasurer of the Medical Department of the University of Colorado since 1885; was appointed dean of the faculty in 1897, and still holds that position; is superintendent also of the University Hospital, Boulder; has been health officer of Boulder and also president of the Boulder County Medical Society for several terms.

Dr. E. B. Queal was born in Clermont county, Ohio; graduated from the high school of Milford, Ohio. After teaching school for some three or four years, began the study of medicine in 1887 at the Ohio Medical College, Cincinnati; graduated in 1890; removed to Colorado, locating at Boulder, and became demonstrator of anatomy, holding this work for some six years; was made professor of physiology in the Medical Department of the University of Colorado in 1897, which position he still holds; is at present a member of the staff of the University Hospital; also secretary of Board of Pension Examiners.

When the Gross Medical College was organized in 1888 the chair of physiology was assigned to Dr. Robert Levy, who filled it continuously and with much satisfaction to the faculty and students alike till 1894, when he relinquished the first year work to Dr. D. H. Ludlow for the session of 1894-1895, retaining the advanced work till 1897. From 1897 to 1899, Dr. George E. Tyler lectured on advanced physiology; from 1895, the elementary work, and from 1899 the entire subject, has been in charge of the present incumbent, Dr. C. B. Van Zant.

Prof Robert Levy was born in Hamilton, Ontario, May 30, 1864. Received his early education in the public schools of Milwaukee and other cities of Wisconsin, concluding his preparatory work in the Denver University; entered Princeton in 1880, remaining, however, but a short time; studied medicine at the Bellevue Hospital Medical College, graduating in 1884; returned to Denver, pursuing general practice for first five years; since that time has practiced special work in the nose, throat and ear; has been professor of physiology at Gross Medical College

and secretary of its faculty since 1891; has also held the following positions: President of the Colorado State Medical Society, Denver and Arapahoe Medical Society, Clinical and Pathological Society; vice president of the Western Section of American Laryngological and Rhinological Society; is at present a member of above societies and of American Medical Association, and holds the position of laryngologist at St. Luke's, St. Anthony's, Arapahoe County Hospitals, and at the National Jewish Hospital for Consumptives.

Dr. D. H. Ludlow took his B. A. at the University of Tennessee; his M. D. at Gross Medical College, with post-graduate courses in Philadelphia and Baltimore. He confined his practice, while in Denver, to the eye, ear, nose and throat, but since going to his present field in Easton, Pa., in 1895, he has been in general practice.

Dr. George E. Tyler was born in Illinois; received his college training at the Kansas Normal College and Columbian University, receiving his B. S.; took his medical course at the Howard University and Long Island Medical College; has practiced in Denver since 1896; was instructor in medicine at the Gross Medical College in 1896, then lecturer on medicine and adjunct professor of medicine, which position he still holds; was lecturer on physiology from 1897 to 1899; is visiting physician at the County Hospital and at St. Anthony's; has been secretary of the Colorado State Board of Health since 1899.

**Dr. Charles B. Van Zant was born in Cincinnati, Ohio, March 4, 1861; received his education in the public schools of that city and in part at the University of Cincinnati; studied medicine and graduated at the Miami Medical College, Cincinnati, in 1884; was resident physician at the Cincinnati Hospital in 1883-1884; engaged in general practice in his native city till 1894, when he removed to Colorado; has taught physiology in the Gross Medical College since 1895. In 1900 assumed the entire work in this branch; is a member of the Denver and Arapa-

**The sketch of Dr. Van Zant was prepared by the Committee on History of Medicine in Colorado.

hoe, Clinical and Pathological, and Colorado State Medical Societies; is at present on the medical staff of St. Anthony's Hospital, National Jewish Hospital for Consumptives, and the Colorado Maternity and Children's Hospital.

EARLY SURGEONS OF COLORADO.

BY CHARLES A. POWERS, M. D., DENVER, COLO.

It is not easy to speak authoritatively on the early surgeons of Colorado, for the reason that during the early history of our state surgery was universally done by the general practitioners. These men were, as a rule, physicians well abreast of the time in which they lived.

One of the earliest to arrive was our late member and former president, Dr. W. F. McClelland, who came to Denver in the early sixties. He had already done a Cæsarean section, saving both mother and child, and this had given him an enviable reputation. About this time, also, there came a Dr. McClure, who, after practicing a few years, died of hæmophilia after an injury to the thumb. At about this time also Dr. J. E. Hamilton, who had had some army experience, practiced for a few months, afterward going to Salt Lake City.

Perhaps the first man coming to the state who might definitely be termed a surgeon was Dr. F. J. Bancroft, who arrived in 1866 after a stage ride of six and one-half days from Atchison. Dr. Bancroft had served with distinction as an army surgeon during the entire Civil war, occupying conspicuous and responsible positions, and though a young man was already a surgeon of skilled experience, clear head and cool judgment. The excellence of his work is known to us all. His name is more particularly associated with the management of fractures and dislocations, in which especial branch of surgery he possessed marked skill. On arriving in the state Dr. Bancroft speedily gained a large practice, which he continued to hold until his

partial retirement from active work, which occurred quite recently. He performed all of the operations of his day with marked success. In 1875 he did a triple synchronous amputation of shoulder, forearm and leg in a little girl; the patient is still living. Dr. Bancroft's great ability as a surgeon, his integrity and prominence as a citizen, and his loyalty as a friend are too well known to need comment here. He is still with us, aiding, when occasion requires, by his ripe experience. In 1867 he was appointed surgeon to the Wells & Fargo stage lines, and to the present day, now thirty-four years, he has always occupied a prominent position as surgeon to some one or other of the transportation corporations of the state.

In 1872 Dr. W. R. Whitehead arrived in Denver. Dr. Whitehead's career had already been remarkably successful for a man of his years. It had been highly adventurous as well. On his graduation in medicine at Paris in the late fifties he entered the Crimean war as an assistant surgeon, serving with marked distinction under Pirogoff. He was in Sebastopol during its siege. For his services he was highly commended and decorated by the Russian emperor. Dr. Whitehead returned to this country about the time of the outbreak of the Civil war, and at once entered the Confederate service as an assistant surgeon, serving under the late Dr. Hunter McGuire. He was captured at the battle of Gettysburg but escaped, made his way north through Canada and in time managed to get back into the Confederate lines, serving with distinction throughout the conflict. At the close of the Civil war he went to New York, there to engage in the successful practice of surgery. Dr. Whitehead's work on cleft palate is too well known to require mention. His famous mouth gag is in use to-day throughout the world. He was one of the first to call attention to the necessity for division of the muscles in cleft palate operations; he devised many useful instruments in connection with this operation. A markedly successful career in New York was cut short by the failure of his wife's health, and in 1872 Dr. Whitehead came to Denver, here to pursue the practice of surgery. In all senses of the word he was a surgeon. His work in connection with stricture of the rectum, hip-joint disease and other surgical topics is well known. This

is not the time for the extended notice which such men as Dr. Whitehead and Dr. Bancroft deserve. Future annals of this society will accord them full credit for the excellence of their work and the nobility of their characters.

A later surgeon and a man well worthy the name of surgeon was Dr. J. C. Davis, whose career as a student, teacher and writer is well known to us all. He was, however, rather of a later date.

In the middle seventies Dr. E. C. Gehrung, now of St. Louis, Mo., engaged in much surgical work. Perhaps he was the first in the state to do definite gynecological operations.

We should not omit to say that practically all of the medical men of the day did what surgery came to them. As an example may be instanced our honored member and ex-president, Dr. Arnold Stedman. Dr. Stedman did practically all of the ordinary amputations. Dr. Steele and Dr. Buckingham also did ordinary surgery.

Dr. H. O. Dodge came to the state about 1868 and settled at Boulder, doing most of the surgery of that region. At Trinidad Dr. Beshoar was a pioneer. Dr. Strickler and Dr. Anderson settled early at Colorado Springs and did the surgery of that region. The Canon City region was cared for by Dr. T. H. Craven; that of Pueblo by Dr. Thombs. Dr. J. H. McMurtrie was a pioneer at Central City. He came out on the same trip with Dr. Bancroft. Dr. William Edmundson was also an early worker at Central City.

Mention of the early surgery of the state would be incomplete without extended reference to one of our most esteemed honorary members, Dr. D. H. Dougan, who also came to the state in early days, well versed in the best surgical methods of the time through intimate association with that splendid surgeon, Dr. Weist, of Richmond, Ind. Dr. Dougan practiced both in Denver and at Leadville, doing a very large amount of surgery and doing it in the best possible way. His integrity of character, forcefulness and earnestness of purpose and charm of personal manner are well known to all of us. Our profession lost one of its foremost workers when Dr. Dougan left it for that of banking.

There are doubtless others who deserve reference. In

these early days surgical methods were rather those of the type of the surgery of our Civil war. The surgeons found, however, that the healing of wounds in this clear, dry climate was indisputably better than they had seen in army life. All of the ordinary operations of that day were done. There was occasional abdominal work, but not very much outside of such conditions as strangulated hernia and the like. The surgery of the day was in general traumatic, rather than pathological. I believe simple fractures and dislocations to have been managed about as well then as now. Fortunately there were few malpractice suits. There were many gunshot wounds. In those days Indian troubles were rife.

We can but honor these early men. They were pioneers in the truest sense of the word. Their resources were very small when compared with ours of to-day, but I believe that their ability to take advantage of such resources as they had was relatively great.

HISTORY OF NEUROLOGY.

BY S. D. HOPKINS, M. D., DENVER, COLO.

Very little was done in this branch of medicine in the early history of this state.

In 1880, Dr. Samuel A. Fisk paid considerable attention to the subject, although he continued in general practice. He taught this branch of medicine in the University of Denver for a number of years.

Dr. J. T. Eskridge was the first member of the profession to limit his practice to neurology in this state, first locating in Colorado Springs in 1884, and in 1885 came to Denver, continuing his studies in this branch. He has done considerable scientific work; contributing articles to the various medical journals and system of medicine. The following are some of the more important writings from his pen:

Retroanterograde Amnesia; two cases. This article was translated into Italian and German.

Tumor Cerebellum. Translated into Italian.

Difficulties in Determining the Causes of Coma. Translated in German Year Book.

Some Remarks on the Plantar Reflex, with Special Reference to the Babinski Phenomenon. Published in German Year Book. Since working in this branch the number of articles published on various disorders of the nervous system has been ninety-seven. He taught neurology in the University of Denver and University of Colorado.

Dr. Howell T. Pershing has been in this specialty since 1889. He has taught this branch in a number of medical schools in Denver and at present is teaching in the University of Denver.

Articles published as follows:

Preataxic Tabes with Optic Atrophy. Quoted by Prof. Raymond in a lecture at La Salpetiere.

A Case of Hysterical Blindness. Quoted by S. Weir Mitchell in Clinical Lectures on Nervous Diseases.

The Disorders of Speech. Systematic treatise forming part of the Twentieth Century Practice of Medicine.

Dr. S. D. Hopkins** became interested in neurology in 1893, when he assisted Dr. J. T. Eskridge in this branch in the University of Colorado. At present he is teaching this subject in the Gross Medical College in Denver. He has written numerous articles on nervous diseases.

**The sketch of Dr. Hopkins was prepared by the Committee on History of Medicine in Colorado.

WOMEN PRACTITIONERS OF COLORADO.

BY MINNIE C. T. LOVE, M. D., DENVER, COLO.

The history of the women practitioners of the state is a tale that is soon told. Previous to 1881, when registration began, there were but three or four who had braved the wilds of the West. Dr. Avery was probably about the first, if not the first, woman to practice regular medicine in the state and territory, coming here early in the seventies. The first record I find of any mention of the existence of the then anomalous being known as the woman doctor is the minutes of the State Medical Society. At the seventh annual meeting of the society, which was its first meeting as a state society, Dr. Parker moved that Drs. H. A. Lemen and Steele be appointed as a committee of two to report on the subject of practice of medicine by *females,* and their recognition by the medical profession of Colorado. The motion carried. Dr. Buckingham then made the following motion: That all female physicians in Denver, who have been regularly educated in the science of medicine, are hereby invited to attend our meeting and to participate in the proceedings. This motion, after full discussion, was finally laid on the table by a vote of 10 to 4.

The committee appointed to report on Dr. Parker's motion reported as follows:

"Mr. President: Your committee appointed to report on the propriety of admitting female practitioners, graduates of orthodox medical colleges to fellowship in consultation and membership in this society, have the honor to report that this question can be alone decided by a vote of the members of the society."

In the minutes no further mention of the subject occurs.

At the following meeting, 1878, the committee on admission reported that Miss Avery, M. D., endorsed by Dr. McBeth, could not be recommended, as she was not a member of a local society. The early records of the county society show that a Miss ———— was refused admission because of unethical con-

duct. In 1881, Dr. Mary Barker Bates, Drs. Root, Anderson and Avery were admitted to the county society. Dr. Eleanor Lawney was graduated by the Denver University in 1887 and bears the honor of being the first woman to be graduated in medicine in this state.

The following year Gross Medical College graduated Dr. Marquette. In 1888 Dr. Rilla Hay, of Pueblo, was admitted to membership in the State Medical Society. In 1887 the county societies became auxiliary to the state. Probably the first public recognition of woman in the practice of medicine in the state was the appointment of Dr. Mary Barker Bates to the staff of the Women's and Children's Hospital about 1885. Dr. Eleanor Lawney served upon St. Luke's staff in obstetrics during the years 1889 and 1890.

The decade just closed has witnessed the advancement of woman in medicine to a fairly satisfactory degree.

All of the medical schools of the state matriculate and graduate young women upon the same terms as young men.

Following the good example set by the two hospitals previously mentioned, the following institutions are recognizing women as members of their working staffs. The Florence Crittenton Home, since its organization, has appointed only women tenton Home, since its organization, has apopinted only women. Owing to the peculiar needs of the work, it is thought best by the executive board to have the visiting staff composed entirely of women. One interne has been required each year for about three years, and it has afforded exceptionally good training for the young women who have served in that capacity. The work of the house covers from twenty-five to thirty maternity cases yearly, besides specific diseases of women, and especially the feeding of infants. During the past six years the Cottage Home staff has been equally divided between men and women.

The Deaconess Home appointed women upon the staff.

Other charitable institutions recognizing women physicians are the Mothers' and Children's Hospital, Denver; the W. C. T. U. Mission maintains a dispensary for women and children, the staff being entirely women physicians. The Flower Mission

medical staff, Denver, and the National Jewish Hospital for Consumptives from the date of organization have recognized women upon the staff, also the State Home for Girls. This institution also recognizes the fact that women should attend to women, and has never had a man in its service, except for special work and in consultation.

When the State Hospital for the Insane at Pueblo was reorganized two years ago, provision was made for the employment of a resident woman physician. Although Colorado was late in falling into line in this respect, as eastern hospitals have so employed women for very many years, we are glad that we are now up to date in that particular.

During the eighties, Dr. Hay, of Pueblo, was appointed as consultant on the hospital staff of the asylum. Pueblo county also established a precedent by appointing twice a woman as county physician.

During Dr. Munn's incumbency as health commissioner of Denver, women were employed as medical inspectors. The present health commissioner is appointing among others women to inspect the public schools. There are undoubtedly many philanthropic movements throughout the state which have recognized women as professional workers, but I have been unable to learn of them all. While there are no women who are entitled to be called "professors," there are several lecturing in the medical schools of the state. As clinical assistants they seem to be appreciated, although I know of no clinics conducted solely by women for women in any of the medical schools.

The Arapahoe County Hospital is, I believe, the only hospital where women are admitted as internes upon the same terms as men. Hospital training goes far towards establishing self-confidence and overcoming the natural timidity of women; and it is to be hoped that soon all hospitals will receive them.

I presume women are eligible to membership in all of the medical societies of the state. The members of the State Medical Society have more than atoned for their early coolness toward women, by electing them to office. Three times the third vice presidency has been filled by women, Dr. Laura Liebhardt and Dr. Mary Barker Bates, and during six consecutive years your

recording secretary has been a woman, Dr. Liebhardt for two years and your present secretary for four years.

About six years ago a Woman's Clinial Society was organized in Denver. Dr. Mary Barker Bates took the initiative in this movement, and the society was launched at Dr. Lawney's office with a membership of about fifteen. The Americal medical code was adhered to. The society meets bi-monthly.

There is a growing conviction among the women physicians of Denver that it is necessary for them to have a hospital under their absolute control, and the beginning is already made by the incorporation of a woman's and children's hospital.

Of civic honors women physicians have had a fair share. The writer, through accident, happened to be the first woman to be apopinted a state officer in the state. After the passage of the bill conferring upon women the full right of suffrage she was appointed on the State Boards of Charities and Correction and Pardons. Dr. Ida Beaver succeeded Dr. Love on these boards and Dr. Eleanor Lawney is serving a second term on the Board of Charities and Correction. The Board of Pardons was separated from the former board about five years ago. Dr. Barry, of Pueblo, who was twice county physician of that county, served one term in the state legislature. The writer has also the honor to be a member of the Board of Control of the State Home for Girls.

Dr. Beere was superintendent of the State Home for Dependent Children for two or three years.

Dr. Mary Barker Bates was twice elected to serve on the school board of School District No. 1.

The records of the State Examining Board show that 106 women have been registered in the state since the bill regulating the practice of medicine in this state was passed, in 1881. They are scattered throughout the state and are meeting with an encouraging amount of success. Their work ranks well with the young men who have been graduated with them, and when one remembers that not centuries but decades represent the time that the profession has been open to women, we must surely feel encouraged. The magnificent impetus given to the higher education of women during the past ten years must result in the plac-

ing of women physicians everywhere in the foremost ranks of those who administer to the sick and suffering women and children of the world. While in a sense it may be true that there is no sex in medicine, modern progress is demanding women for women, in all diseases peculiar to her sex; and the two departments of the medical profession which the future will see closed to the male practitioner are those of obstetrics and gynecology.

THE HISTORY OF THE DENVER HEALTH DEPARTMENT.

BY WILLIAM P. MUNN, M. D., DENVER, COLO.

Prior to 1885 the charter of the city of Denver did not specifically provide for a department of public health under the direction of a health commissioner. The duties of health officer were performed by the city physician, who was elected by the people or by the council, and who in addition attended all the sick poor, cases of accident, and performed the duties now relegated by common consent to the police surgeons.

The first book of records in connection with the vital statistics of Denver was evidently the private property of Dr. F. J. Bancroft, who served as city physician in the year 1878. It was originally a case book and contains the notes of some physical examinations of the chest, with diagrams illustrative thereof. It was then transformed into a book of records for births and deaths, the rulings and the transcripts being in the doctor's own handwriting.

There is a record of a previous city physician, Dr. Samuel Cole by name, but beyond the mere fact that he held office there is no evidence of any work done by him. In 1879, 1880 and 1881, Dr. J. W. Graham occupied the position, and among his first official acts was the issuance of an order declaring an emergency for the construction of a public sewer down Sixteenth street. The civil engineer who co-operated with him in con-

structing this sewer was Harvie Lowrey. It is worthy of note that this was the first "separate sanitary sewer" actually constructed in America, antedating the then talked of system for Memphis. Mr. Rudolph Hering, the leading sanitary engineer of America, is my authority for this statement, and he regards this piece of construction as having marked the beginning of a new era in sanitary drainage systems. Drs. Anderson, Labrie and Hamer, names practically unknown to the regular profession of to-day, were Dr. Graham's successors in office.

In the spring of 1885 many of the present provisions of the city charter became operative. For the first time a health department existed with a health commissioner as its executive officer. Dr. Herbert W. McLauthlin was the first health commissioner of Denver, and many of the regulations and ordinances now in force were originated by him. The system of administration was first systematized by him, acting under the direction of a Board of Health, which consisted of the mayor, the chief of police, the presidents of each branch of the city council and the health commissioner. This formation of the Board of Health persisted in the charter until 1893, when it was abolished, all the powers of a board of health remaining with the city council, in accordance with the general health laws of the state of Colorado and the health commissioner remaining its executive officer, empowered to make and enforce temporary regulations that have the same effect as ordinances, provided they do not conflict with ordinances already enacted by the actual Board of Health, that is, the City Council.

Dr. W. M. Robertson served as health commissioner after Dr. McLauthlin. His immediate successor was Dr. A. A. Clough. After him came Dr. H. K. Steele, under whom the administrative methods of the department were largely changed, modernized and placed upon a definite scientific basis. The sanitary reforms wrought during his incumbency were many, and when he died in January, 1893, shortly before the expiration of his term of office, he was mourned by the public as no other member of our profession in this city has ever been. It was indeed said at the time, nor do I think that lapse of years can change the verdict, that Denver had lost her greatest citizen. His monument need

never be reared in marble or in bronze; no tablets of beaten brass or burnished silver need record his virtues; no windows of colored but perishable glass preserve his pictured form. He lives in the grateful hearts of his fellow-citizens; he lives in the perpetual memory of his good works; he lives in a thousand home circles that remained unbroken because of his work of loving self sacrifice; he lives in the unending influences of life-saving work started through his efforts.

Yet the community has in some wise done a little to preserve his name in connection with that very work. When he lay upon his death bed, his last thoughts were engaged with the plans for a hospital for children who were suffering from contagious diseases, and who on account of the character of their illness could not be accepted in other hospitals. It was decided by the City Council of Denver that the institution which had commanded his last thoughts and loving energies should forever bear his name. It exists to-day in modest quarters, doing its good work with little public recognition and but scant financial support, known as the Steele Memorial Hospital. The institution consists of six cottages with a capacity of forty beds, in which diphtheria, scarlet fever and measles are cared for in separate buildings. In the four years 1895 and 1898 inclusive, there were 488 cases treated, with eleven deaths. It is hoped that as the city of Denver increases in size and becomes better able financially to support such an institution, the buildings will be replaced by others more suited to the purpose, more imposing in construction and arrangement—perhaps located in better surroundings.

After Dr. Steele's death his position was filled for three months by Dr. Arnold Stedman, who served, as Dr. Steele had done, without remuneration, allotting his salary for the payment of assistants.

The next term was served by Dr. L. E. Lemen, whose service expired in April, 1895. His term was notable for the enactment into a law of the sanitary code that had already been prepared by Dr. Steele and his assistants, and by the establishment of a bacteriologic laboratory in December, 1894. This was at first in charge of Dr. LaGarde, of the United States army,

but as he was unable to give much time to the work he was superseded by Dr. H. C. Crouch, under whose care the laboratory first became popular with the medical profession of the city. Thus was instituted the public examination of diphtheria cultures, followed in 1896 by systematic daily examinations of the public water supply. In 1895 Dr. W. P. Munn was appointed health commissioner and served until 1899, when he was succeeded by Dr. T. J. Carlin. The bacteriologic laboratory passed under the control of Dr. W. C. Mitchell at the death of Dr. Crouch in February, 1898. It may be said without contradiction that Dr. Mitchell's services as bacteriologist were highly appreciated by the profession of the whole city. He introduced the public use of the Widal test for typhoid fever and conducted considerable original work in the investigation of the toxin of diphtheria, the tests of commercial products of antitoxins as put upon the market, the relative value of various gaseous disinfectants and the effects of direct sunlight upon the vitality of the tubercle bacillus. His retirement from the charge of this branch of scientific work was universally regretted by the profession of medicine, and emphasized, as no other incident in connection with our public health administration, the debasing effects of our local political methods, which seem to set a standard of political belief rather than a standard of efficiency and usefulness for our public servants.

The gradual development of an efficient and successful department of public health is a record of the education of professional and public opinion upon matters related to hygiene and sanitary science. The greatest step forward was made when Dr. McLauthlin succeeded in establishing by law the custom of placarding houses for contagious diseases. This was followed by the method of distributing to the infected houses circulars of instruction as to the methods by which the family could co-operate with the physician and the health officer. Educational leaflets distributed to every family in an infected area followed, and lastly came the method of addressing the general public by means of health department bulletins in the daily papers, and by the distribution of circulars of information in the public library and other places to which the intelligent people are apt to resort. Addresses to educational assemblies, woman's clubs, city and dis-

trict improvement societies have been methods of great value in enlisting and maintaining the interest of the people in sanitary advances.

In these modern times the warfare of quackery and charlatanism against sanitation as a division of modern medical effort is constant and unrelenting. Science is continually misrepresented; doctors are continually maligned; advances in scientific knowledge are distorted and if possible made to appear ridiculous. The missionaries of falsehood, bigotry and ignorance unceasingly clack their falsehoods and nonsense into the ears of the people, who only too often hear them and believe. It has therefore become incumbent upon the modern medical health officer to become more or less of an educational agent for the profession to the public. Sanitary advances must be explained, fully, patiently, reasonably, to the inquiring public, while at the same time the executive administration must be conducted with firmness, judicial fairness, judicious exercise of power and unrelenting pursuit of the causes of disease. The extermination of contagious and infectious disease within the limits of his authority is the high ideal which a good health officer must set for himself; to that end he must bend every atom of his energy, every wile of his diplomacy, every exercise of the just powers conferred upon him by the law. Withal he must combine a humane spirit with his inflexibility, the discretion of age with the enthusiasm of youth, brutal frankness when necessary, with kindly courtesy when possible. The reports of the operations of a health department must be frank, straightforward, concealing nothing. It was the effort of the writer of this sketch, in his administration of the health office of Denver, to be governed by these principles. That they were successful in gaining an unprecedented degree of confidence of the profession and public is true. Results in reduction of prevalence of sickness and lessening of mortality must speak for themselves. To my mind they speak with a cogency, force and directness that is unanswerable.

HISTORY OF THE COLORADO FUEL AND IRON COMPANY'S HOSPITAL.

BY R. W. CORWIN, M. D., PUEBLO, COLO.

It will be impossible to confine my remarks to the hospital simply, for the hospital work is only a part of the work of the medical department of the fuel company.

The Colorado Fuel and Iron Company's Hospital reached its majority this year. It was born in the valley of the Arkansas, among the Pueblos of a village bearing that name, in 1880, just twenty-one years ago.

This little pappoose of the plains slowly and steadily developed, through the goodness of the Colorado Coal and Iron Company, which always showed it a maternal fondness and consideration.

Nine years ago the Colorado Coal and Iron Company and the Colorado Fuel Company sonsolidated, and the family name became the Colorado Fuel and Iron Company, since which time the young Puebloan has rapidly developed, and at the age of twenty-one is found to be quite a healthy buck.

The Colorado Fuel and Iron Company Hospital had a modest beginning. At first a company house, located near the steel works, was converted into a suitable building for the comfort of the sick and injured, and accommodations for fifteen patients secured.

At his request, I accompanied Mr. A. H. Danforth, General Manager and Vice-President of the Colorado Coal and Iron Company, from Chicago to Colorado, and assisted in the organization of the medical department of the company, then returned east for supplies, leaving Dr. Fred. H. Lay in charge.

The first season was a very trying one. From May to November there was no rain, the water supply was poor, houses scarce, food not inviting, and the weather hot. That summer developed 133 cases of what was then called mountain fever, but

now we know it to be typhoid fever. Fortunately the mortality was not great, only three deaths occurring.

In the fall of 1882, the Colorado Coal and Iron Company and the Denver and Rio Grande Railroad Company jointly erected a brick hospital on the mesa of Pueblo with accommodations for 30 patients, the temporary hospital building at Bessemer being retained as a dispensary.

At this time the Colorado Coal and Iron Company had three iron camps, four coal camps and a steel plant at Bessemer.

The medical corps consisted of J. T. O'Connor, of Salida; A. T. King, Coal Creek; John Grass, Trinidad; Dr. Martin, Walsenburg; Dr. Snyder, Crested Butte; Dr. Cochran of the U. S. A., Fort Garland; Dr. J. N. Pascoe, at the hospital, and myself.

The sick and injured company employes were attended by the local physicians, and cases requiring hospital attention were admitted to the company's hospital at Pueblo.

The company opened new mines; the steel works expanded; and soon additional hospital room was required.

In 1890 the hospital was enlarged to accommodate 45 beds. That year there were treated nearly 200 indoor patients and about 6,000 outdoor cases. Many of the cases would be interesting to relate in detail, but space will not permit.

It may be pardonable perhaps to refer to one case occurring at the Orient iron mine in the winter of 1882. It illustrates the embarrassments in the early days of the hospital's existence, and results obtained at times under unfavorable conditions.

Mr. P., age 47, miner, was tamping a blast. A premature explosion occurred, elevating him about thirty feet (his own estimate was greater), and dropped him over an embankment among rocks, about forty feet below the point of starting. He was taken in a freight car, thirty-three miles to Salida, and from there in a day coach, was brought to Pueblo, arriving at the hospital at 2:30 a. m. The weather was bitterly cold, and conveniences for moving patients crude.

When Mr. P. arrived at the hospital it was ascertained that he had sustained a six-inch fracture of the parietal and occipital bones, and brain tissue was escaping through the wound. There

was also compound fracture of the left malar, double compound fracture of lower maxilla, fracture of left humerus, left radius, left ulna, right tibia, right fibula, and many lacerated and contused wounds. This was all we could find. He afterwards remarked he felt pretty well broken up.

In those days asepsis was little known and rarely observed. The remarkable thing about this case is that it made a rapid and uneventful recovery and soon ceased to be interesting.

One of the saddest events ever connected with the medical department of the company was the explosion at Crested Butte, which, through the carelessness of a man entering the mine against orders with an open lamp, caused an explosion and the death of sixty-seven comrades, only one person in the mine escaping, he sustaining superficial burns.

The consolidation of the Colorado Coal and Iron Company and the Colorado Fuel and Iron Company doubled the number of mines and employes.

In 1895 an operating room and dispensary, at an expense of $4,000, was built. A unique and interesting feature of the operating room is its floor, which is of lead, and has given perfect satisfaction. It might be improved by carrying the lead up the sides of the room to the height of five or six feet. While not an æsthetic floor, it has more good qualities than any I know—noiseless, impervious, not slippery, no joints or cracks, not easily damaged, and readily repaired and cleaned.

In 1897 a large wing was erected, making the capacity of the hospital 80 beds.

In 1899 a training school for nurses was instituted.

The capacity of the hospital has recently been increased, and now has accommodations for 95 patients.

It is equipped with a bacteriological and pathological laboratory; X-ray machine; Betz small leg and arm, and Truax, Greene & Co. large, dry air heating apparatuses; Truax, Greene & Co. largest sterilizer, and hot and cold water tanks; and a Cummings rubber-tired two-horse ambulance.

This year, however, has been the most eventful in the history of the hospital. The company has not only made many additions and enlargements to the steel plant, but has recently acquired 270,000 acres of coal land in Southern Colorado, which

is being developed, and additional coal mines in the western part of the state, and in Northern New Mexico; also iron mines and lands in New Mexico, Utah and California, which has greatly increased the number of employes. All this has vastly multiplied the demands upon the hospital, and rendered its capacity inadequate. The company, therefore, decided to erect a new hospital, and work upon it has been commenced. A site was selected in Pueblo, beside Lake Minnequa, on a twenty-acre tract of land overlooking the water, with a magnificent view of the mountains on the west, and the great plains to the east; an ideal spot for the sick or well.

The new hospital will be mission style of architecture, two stories, of the slow combustion construction, with fire-proof floors. Its capacity will be 200 beds, but planned for a plant readily increased to a capacity for 396 patients.

A novel feature of the hospital building is that although it is of two stories, it will have no stairs or elevator, but inclines instead.

The administrative building and dining-rooms, which occupy a central position, are connected with the wards by long, light corridors.

The building will be heated by steam, and supplied with a fan ventilating system, and lighted by electricity.

The heating plant, which will supply heat for all the buildings on the ground, will be a detached building, to lessen the danger from fire.

There is already erected on the ground a hospital with twelve rooms for communicable diseases, and a physicians' residence. There will also be a nurses' home, a smoking and game building for convalescents, and barn for ambulance and horses.

Aside from the city, water is supplied from a well, an artesian well and a reservoir.

The contract, which has been let, calls for the completion of the above on December 1, 1901.

At Bessemer there is being erected a six-room brick dispensary with dressing rooms and baths; at Gallup, New Mexico, a 20-bed hospital for the coal mines; and at Fierro, New Mexico, and at Sunrise, Wyoming, emergency wards. At each of the mines there is a dispensary and an office for the doctor.

A better idea of the work accomplished by the medical department may possibly be obtained by giving the figures from the annual reports for the last three years:

	Year ending June 30th.		
	97-98	98-99	99-1900
No. of patients treated at hospital.	436	643	750
Total number of patients treated in the department.....	28,980	40,226	42,883

This year the number treated in the hospital will be about 1,000, and the total number of patients treated in the department about 50,000.

The company has added to the medical department proper a sociological department for the purpose of improving the conditions of the men and families, thereby increasing health and comfort and decreasing sickness and suffering.

This will include among many of its features kindergartens and schools, domestic science teaching, libraries and lectures.

The personnel of the medical staff, taken from the annual report of this year, is as follows:

R. W. CORWIN, M. D., Chief Surgeon, Pueblo, Colo.

T. J. FORHAN, M. D., Assistant Chief Surgeon, Engleville, Colo.

A. L. Trout, M. D., Berwind, Colo.
M. J. Sanborn, M. D., Brookside, Colo.
L. G. Clark, M. D., Cardiff, Colo.
S. C. Clarke, M. D., Coal Basin, Colo.
A. A. Eddy, M. D., Coal Creek, Colo.
J. W. Rockefeller, M. D., Crested Butte, Colo.
E. D. Harper, M. D., Gallup, N. M.
J. J. Pattee, M. D., Gibson, N. M.
A. B. Hamilton, M. D., Laramie, Wyo.
J. O. Michael, M. D., Madrid, N. M.
O. P. Shippey, M. D., Orient, Colo.
T. D. Baird, M. D., Pictou, Colo.
W. T. H. Baker, M. D., Pueblo, Colo.
C. V. Marmaduke, M. D., Pueblo, Colo.
E. M. Marbourg, M. D., Pueblo, Colo.
W. R. Hoch, M. D., Pueblo, Colo.

L. B. Pilsbury, M. D., Smith's Canon, Colo.
H. C. Dyer, M. D., Spring Gulch, Colo.
Angus Taylor, M. D., Redstone, Colo.
W. A. Williamson, M. D., Rockvale, Colo.
W. S. Chapman, M. D., Rouse, Colo.
A. W. Scarlett, M. D., San Carlos, Colo.
C. O. McClure, M. D., Starkville, Colo.
J. E. Lowery, M. D., Sopris, Colo.
H. C. Lee, M. D., Sunrise, Wyo.
D. W. Matthews, M. D., Walsenburg, Colo.

Internes of Hospital Department—R. E. Holmes, M. D.; H. S. Olney, M. D.; W. P. Payne, M. D.; E. P. Storey, M. D.

Superintendent of Training School—Jennie S. Cottle, Pueblo, Colo.

Hospital Steward—C. J. Kastholm, Pueblo, Colo.

Consultants—A. T. King, M. D., Pueblo, Colo.; Hubert Work, M. D., Pueblo, Colo.; P. R. Thombs, M. D., Pueblo, Colo.; E. W. Varley, D. D. S., Pueblo, Colo.

HISTORY OF ST. ANTHONY'S HOSPITAL.

BY RUSSELL B. FREEMAN, M. D., DENVER, COLO.

St. Anthony's Hospital, begun in 1891 and finished in 1893, was built under the auspices of the Sisters of St. Francis at a cost of $190,000. It is a beautiful brick building of four stories, trimmed with granite, situated by the side of Manhattan lake, one of the largest lakes in the vicinity of Denver, on a high plateau overlooking the city and far enough away to escape the noise and smoke, yet directly connected with the city by electric car line.

The hospital is built in two wings looking toward the east and south, thus giving the largest exposure possible to the sun. A corridor runs through the center of the whole building on

each floor, with rooms and wards on each side opening into it. The ventilation, sanitation, general appointments and furnishings are of the best and excellently adapted for the purposes required.

The hospital is presided over and run by a corps of forty Sisters of the Order of St. Francis, who carry out the nursing and general work of the hospital, and a staff of thirty-six physicians, twenty-two of whom are active members, fourteen consultants and alternates. It is perhape needless to state that all are working harmoniously and nothing is being spared that will improve and render the hospital more efficient. Two resident internes are appointed from the graduating class of Gross Medical College, each serving for one full year.

Within the past year a large wing of three stories has been added on the east side at a cost of $40,000. This is connected with the main building by a corridor on each floor eighty feet long, with a large reading room jutting out from the center toward the south. The walls of the corridors and reading rooms are well supplied with windows; here are excellent lounging rooms for convalescents. The first floor contains, beside reception rooms and rooms for resident internes, one of the largest, most modern and best equipped surgical operating rooms to be found in the United States. The second and third stories are devoted to a large and very handsome chapel.

The hospital contains 212 beds, 60 rooms being reserved for private patients, the balance of the hospital being divided into rooms containing from two to ten beds each. The number of patients treated were for the first year, 1893, 120, and have steadily increased at the rate of 100 to 125 yearly, until in 1900 there were treated 1,100 in all, 585 medical and 515 surgical patients. The present year shows thus far a proportionate number.

The hospital has its own artesian well, and has its supplies of vegetables, poultry, eggs, milk, etc., from its own farm of 280 acres at Longmont. These insure a pure and fresh supply of both water and food.

Additions of land have been made from time to time until now the hospital grounds comprise ten acres, a large part of

which has been made into a beautiful park with fountains, shade trees and arbors, offering excellent opportunities for convalescents.

The whole hospital and grounds present a very pleasing appearance and the sanitary and general appointments are such as would be expected in a first-class hospital, which it is.

HISTORY OF ST. JOSEPH'S HOSPITAL.

BY W. W. GRANT, M. D., DENVER, COLO.

The Sisters of Charity of St. Joseph's Hospital came to Denver in 1873 and established their first hospital at the corner of Twenty-second and Blake streets in a house that had formerly been used as a hotel. In 1876 they erected and moved into a brick building on Humboldt street and Eighteenth avenue. This was occupied and used until 1900. In 1890 the south wing of the present building on Eighteenth avenue and Humboldt street was erected. On the 23d of July, 1899, the corner-stone of the adjoining new building was laid, and the hospital formally opened for the reception of patients in June, 1900.

The south wing contains 47 rooms which will accommodate 75 patients.

The new or administration building contains 62 rooms, which provide for 75 patients. There is a fine, modern operating room, splendidly lighted, on the third floor, with sterilizing and anæsthetic rooms, surgeons' dressing room, and a dressing room for patients.

The kitchen, dining and cold storage rooms, pharmacy and office are in this building; also rooms for the Sisters, nurses and clergy.

The medical staff was organized in 1893. Its staff, as at present constituted, is: In the surgical department, J. W. O'Connor, Leonard Freeman and C. B. Lyman; gynecology, W.

S. Bagot; medical, P. V. Carlin, C. P. Burns, H. H. Martin and J. B. Devlin; diseases of chest, F. E. Waxham; obstetrics, A. R. Seebass; neurology, Edward Delehanty and H. T. Pershing; diseases of children, A. K. Worthington; ophthalmologist, C. E. Walker; hæmology, A. M. Holmes. Dr. W. B. Craig was elected first president in 1893 and others in the following order: 1894-95, L. E. Lemen; 1896, W. S. Bagot; 1897, W. W. Grant; 1898, C. P. Burns; 1899, H. L. Taylor; 1900 and 1901, P. V. Carlin.

Three internes are elected annually to serve one year. The hospital has a training school for nurses which is not sectarian in its membership and work. It treats about 1,400 patients annually.

This hospital, with its excellent and accessible location, its modern equipment and good work deserves the place it holds in the respect and confidence of the people.

SKETCH OF THE HEALTH MONITOR.

BY P. D. ROTHWELL, M. D., DENVER, COLO.

The first appearance of this monthly journal was on September 15, 1889. Twenty thousand copies were published. The second issue of 5,000 copies appeared on October 15. The editorial department was directed by Drs. W. J. and P. D. Rothwell; the business department by Drs. Frank Dulin and C. E. Bryant. Shortly after the appearance of the second number there was a disagreement amongst the members of the company as to the proper methods of the ethical and financial management. This disagreement caused the withdrawal of Drs. Rothwell and Dulin. They settled all the debts of the company at one hundred cents on the dollar. Under the editorship and management of Dr. C. E. Bryant a few numbers appeared, after which the *Health Monitor* ceased to exist.

Let us look at some of the objects this journal had in view and see if there was a reason for its existence. It boldly championed the fact that there should be a means of communication between the medical profession and the people. It pointed out in its columns that thousands of articles were appearing in medical journals and even in text-books that were really intended to reach the public; instead of this they reached members of the profession already familiar with the matters under consideration. Why this foolish waste of effort? queried the *Health Monitor*. Why not direct this useful current of information in the proper channel? Emphasis was put upon the fact that the advances in sanitary science were due to the efforts of the medical profession, and that the people should be kept in touch with such advances in order that they would be quicker to appreciate the work of boards of health in trying to check the spread of contagious diseases. This journal was assured that many of the superstitions still lingering in the public mind originated in the infancy of science. They are, so to speak, the medical ruins of former ages. The *Health Monitor* undertook to combat superstition in all its forms; from the horse chestnut for rheumatism, the horseshoe for good luck, the ill luck of Friday and the number thirteen, to the demented vaporings of a Mrs. Mary Barker Eddy, who would have us believe that everything is God, even to the excrement passing along the sewers of our city.

Patent medicines were to be shown up in their true light and an earnest effort made to let the people see the folly of any man or company attempting to prescribe for the million. Quacks and quack advertisements were to receive such attention as would finally enlist the co-operation of the people in their downfall. How, do you ask? By teaching the truth—the only known method of combatting error.

The various health resorts and mineral springs of the Great West were to be written up from a scientific standpoint—not from the view of the real estate boomer, the newspaper correspondent, or the enthusiastic lunger restored to health. Each one of the aforesaid, and some of them doctors, has made statements that have brought the blush of shame to the face of the scientific physician.

The columns of this journal were open to the public. They were at liberty to point cut the shortcomings of the medical profession so that we could see ourselves as others see us. Nurses were given a place where they could feel at home to urge their claims and relate experiences that would be profitable to physicians and patients.

Questionable advertisements could not find a place in the *Health Monitor,* neither for love nor money. References to proprietary medicines were rigidly excluded. Remember distinctly that there was no intention to try to make every person his own doctor; on the contrary, every article and every sentence of that article pointed out the position of physician and patient and that they were not interchangeable as a Dr. Jekyl and Mr. Hdye.

Read No. 1, Vol. I, and you will find these truths set forth: *Prevention* is more important than *cure;* the *doctor,* as the name implies, is a *teacher;* there is no *mystery* in the practice of *medicine;* a sound mind needs a sound body; drugs should be *servants,* never *masters.* You may say that the *Health Monitor* was ahead of its time. I will meet that by maintaining that the teachings of Jesus Christ, judging from the present rate of progress, were five thousand years ahead of the people of his day. Had this journal been in the field from 1889 to the present time, and had it received the hearty co-operation of the profession, there is no doubt that some of the seeds sown would at least have taken root and possibly have borne fruit in a few instances. Our efforts were appreciated by many physicians, as we have letters to prove, and had we continued longer in the field many others would have rallied to our standard. We did not expect to enlist either the physician that looks upon his profession as a trade, or the one that would say, "The public be damned. If they want to be humbugged, let them."

The unknown land of journalism in which the *Health Monitor* was a pioneer is still unoccupied. It is a goodly land, not exactly flowing with milk and honey, and yet a land of promise.

In the interest of genuine progress, it is my earnest wish that a Joshua may soon appear and lead this society or some of its members into this promised land.

THE ORIGIN AND DEVELOPMENT OF THE COLORADO MEDICAL JOURNAL.

BY WILLIAM N. BEGGS, A. B., M. D., DENVER, COLO.

The Colorado Medical Journal had its beginning and first year of publication in the *Colorado Climatologist.* Of this Dr. Charles Manley was the editor and publisher. It was not my privilege to know him personally and therefore I have requested his widow, Mrs. Calista Manley, to favor me with a short sketch of that publication. From her letter I quote the following:

"Its history is that of a long cherished plan, carried through one brief year of consummation and success.

"For from the moment of Dr. Manley's youthful decision to be a physician, dates also his determination to devote himself to the progress and accuracy of medical knowledge, an object which he considered to be best attained through the medium of a first-class medical journal, held to a high scientific standard. It was long his ambition to establish and maintain such a publication, which even a subsequent struggle with tuberculosis could not alter—even though Dr. Charles Denison said, "Don't do it. You will be dead in a year if you do."

"Having opened his office and begun to practice, he planned for the fulfillment of this ambition. In November, 1884, with the cordial co-operation and support of a number of leading medical men in Colorado, he issued the first number of the *Colorado Climatologist,* having the following list of collaborators:

Dr. Josiah N. Hall, Associate Editor.
Charles Denison, M. D., Denver, Colo.
Samuel A. Fisk, M. D., Denver, Colo.
Clayton Parkhill, M. D., Denver, Colo.
Frank E. Waxham, M. D., Denver, Colo.
J. T. Eskridge, M. D., Denver, Colo.
Carl Ruedi, M. D., Denver, Colo.

Maurice A. Walker, M. D., Denver, Colo.
Hubert Work, M. D., Pueblo, Colo.
Richard W. Corwin, M. D., Pueblo, Colo.
Herbert B. Whitney, M. D., Denver, Colo.
S. Arthur Bosanko, M. D., Leadville, Colo.
Jesse Hawes, M. D., Greeley, Colo.
E. A. Lee, M. D., Fort Collins, Colo.
J. J. Topliff, M. D., Longmont, Colo.
S. E. Solly, M. D., Colorado Springs, Colo.
William P. Munn, M. D., Denver, Colo.

"While he held the active co-operation of these men, the entire financial responsibility and business management devolved upon Dr. Manley. He said in his

PROSPECTUS.

"A combined circulation of one million copies per month is claimed by the medical journals of the United States. In the presence of such overwhelming figures, the editor of a newly organized medical publication must of necessity be possessed of much assurance if he hopes to find recognition. But there are fields of medical journalism as yet untouched. Among the numberless monthly publications of medical literature in our country, there are none devoted to climatology. Among the many western journals, none is devoted exclusively to the medical news of the great West—a West so thronged with physicians whose able researches are rapidly gaining for them reputations abroad. Here, then, is virgin soil, and in coming before the public, we announce our intention of issuing a journal which shall be

"1. A journal which shall be devoted especially to the study of the relations of disease to climate, altitude, mineral springs and occupation; and to the record of current medical events in that group of states of which Colorado is the natural center, and Denver the heart.

"2. A journal for the physicians of those states which shall be the true exponent of the *esprit de corps* of the West as found in the medical societies.

"3. An independent journal, not pledged to the support of any medical school or clique.

"As a journal of climatology, we shall present to our readers new and valuable information from writers already well known; and shall further introduce other investigators who, as yet, have lacked a suitable and eligible medium for contributing to the literature of this subject. Giving the records of a score of scientific men practicing in this, the largest clinic of the world, we may fairly expect to be welcome to a large constituency in this section, and to our friends in the East. We hope thus to present facts and methods interesting and new in the theory and practice."

"Dr. Manley issued the *Colorado Climatologist,* with the added title, *Denver Medical News,* as indication of keeping a record of current events in that city of interest to the medical profession.

"Having completed eleven numbers with the twelfth ready for the press, Dr. Manley died November 13, 1895. So long cherished and dear a project could not be given up without much planning and hoping for its future, and many times he said, 'If Dr. Axtell would only take my journal! He is the only man who will make it the success I want it to be.' Consequently I begged Dr. Axtell to take it up. This he very generously consented to do, although he considered it best to change the name to *Colorado Medical Journal,* as being a title of wider range.

"In taking up the journal Dr. Axtell said: 'With the greatest sacrifice to his best health interest, and at times with a raging pulse and marked temperature, Dr. Charles Manley, its editor, has worked and struggled to make it a success. It has been a success. The vim and energy he put into it was almost pathetic. Up to his dying moments the *Colorado Climatologist* was his beloved ambition.' Quoting this, the *Kansas City Medical Index* adds editorially: 'A victim of tuberculosis, Dr. Manley devoted the last years of his life to combatting its ravages in others. The good work was undertaken bravely, and how successfully the valuable pages of the *Climatologist* can answer. It is eminently fitting that the paper for which he labored so assiduously should be complete with his decease. May the good he has done be his glorious monument.'

"In your issue of January, 1900, you will recall Dr. Hawkins' allusion to Colorado editors, in which he remarks:

'Then came the earnest, scholarly and indefatigable Dr. Manley with the *Colorado Climatologist.* He was an able and conscientious editor. When the *Climatologist* was no more than fairly initiated Dr. Manley died, and the work was taken up by Dr. Axtell.'

"The *Climatologist* was a success from the beginning, and won more and more the sympathy and help of the profession in Denver and the state. Financially, of course, there was a deficit, but the smallness of that, considering the enterprise launched, was a farther sign of success, and the foundation was well laid for Dr. Axtell's work."

So the pen so laid down by Dr. Manley was taken up by Dr. Axtell. With him was associated as manager Dr. E. A. Sheets, who continued with the *Journal* in that capacity until May, 1899. Of him Dr. Axtell wrote: "We found him of the greatest executive ability, of the highest business attainment, of an integrity that was ever pure. His advice was always sound, and it is due largely to his efforts that this journal has made the success that it has. It was a pride of his to give the profession here a high grade local medical journal. He stood side by side with the present owner of this journal in every improvement, and his suggestions were always practicable."

The elevated course to be followed by the *Journal* as delineated by Dr. Manley was conscientiously pursued by Dr. Axtell. His views as to the proper functions of the *Journal* were well expressed in an article on "The Local Medical Journal," contributed by him to *The American Medical Journalist* in 1898.

"I regard the primary function of the local medical journal to be a record keeper of the local medical history of its section. Holding such views, I think it necessary for the local medical journal to publish the minutes, or a report of the minutes, of the local medical society or societies; it must publish all resolutions of local medical bodies, death notices of medical men or contributors to hospital or local medical libraries, news items, addresses delivered before medical and semi-medical bodies; it must get, at all cost, or at some inconvenience, all the papers dealing with original work in its section; if it cannot get all it

should publish in full the reprint.* It should be the medium of the local physician to say what he thinks about the county society, about the board of censors of any particular society, about matters of hygiene, sanitation, public health service, or quarantine, which affect his section of the country. It should contain notes of all good work by local men. Certainly it should contain carefully prepared reviews of books written by local medical men. It should have editorials on local matters. It should contain, in my judgment, all the necessary news items on which to build a medical history of the section. Such items would include historical sketches of societies, not only medical, but allied sciences. It should be the medium whereby any enterprise of the medical men in the way of entertainments or official gatherings should be brought to the attention of the entire local medical profession. It should support the various health boards, commissioners of education, in all things leading to the further advancement of their work. It should protest against needless and harmful legislation by foolish legislators.

"It should publish, as the occasion demands, half-tones of the prominent local medical men. I remember the time when a half-tone in a medical journal was the only likeness that could be obtained of a prominent local practitioner.

"It should seek to lead the local profession to a high standard of fellowship, and should be progressive enough to condemn local matters that need righting."

How well Dr. Axtell accomplished the work thus proposed by himself, for himself, only those who were fortunate enough to read the *Journal* regularly know. He was a man of attractive personality, and that made itself felt in the pages of the *Journal*. His aims were high and he left his impress on the profession of this city and state. He was an excellent financier and had marked

*To this the present editor would take some exception. The duties do not all lie on the side of the local journal. To a certain extent they are mutual. The local journal opens its pages to the local men, and they should also seek it as well as be sought. The only way to have a local medical journal or a local medical anything is to have it. The only way to accomplish that is by mutual endeavor and co-operation.

executive ability, thus securing stability to the offspring of his heart and brain.

In an editorial written, presumably by him, for the number for April, 1899, he said: "As we traverse the days of the little space allotted to each of us for work and recreation, we recognize that the days are too short, the hours too swift, and the years like a dream that has passed. One duty stares us in the face, another is at our elbow. We breathe the breath of the morning, get into the current of life and swim and battle, and the night is upon us. What a lot of things we wanted to do! What a lot of things we have had to leave undone! It is too bad that there is so much for a man to do. It makes him restless, nervous, and upsets his digestion, and the work he does is not the best work he is capable of doing. It is too much work. The pace is too fast. As we get older the duties of practice encroach seriously upon the writing time and there is no rest, no recreation, and soon the bright, energetic, buoyant man is old and worn." Thus, unconsciously perhaps, did he forecast the undermining of his own strength. In a few short months thereafter he fell a victim to the faithful performance of his duty. His death was so recent that we all still feel the shock and pang.

In the winter of 1896-1897, I first became acquainted with Dr. Lincoln Mussy, one of nature's noblemen. We soon became associated in our practices, and our acquaintanceship deepened into intimacy. Feeling that there was probably room in that portion of the West comprising the Rocky mountain states and territories for a medical publication not so strictly local in its lines as the *Colorado Medical Journal,* and yet not so broad as to lose its local color and identity, we associated with us as business manager Mr. (now Dr.) W. H. Sharpley in the publication of the *Western Medical and Surgical Gazette.* The first number appeared in November, 1897, with the following list of collaborators:

John P. Bryson, M. D., St. Louis, Mo.
Wm. A. Campbell, M. D., Colorado Springs, Colo.
C. K. Cole, M. D., Helena, Mont.
P. S. Conner, M. D., Cincinnati, Ohio.
H. S. Crossen, M. D., St. Louis, Mo.

Charles Denison, M. D., Denver, Colo.
Jos. Eichberg, M. D., Cincinnati, Ohio.
J. T. Eskridge, M. D., Denver, Colo.
Leonard Freeman, M. D., Denver, Colo.
Frank R. Fry, M. D., St. Louis, Mo.
J. N. Hall, M. D., Denver, Colo.
Robert Levy, M. D., Denver, Colo.
Robert LeMond, M. D., Denver, Colo.
Laura L. Liebhardt, M. D., Denver, Colo.
James A. Lydston, M. D., Chicago, Ill.
H. H. Mudd, M. D., St. Louis, Mo.
William P. Munn, M. D., Denver, Colo.
Clayton Parkhill, M. D., Denver, Colo.
W. J. Rothwell, M. D., Denver, Colo.
E. C. Runge, M. D., St. Louis, Mo.
E. Stover, M. D., Pueblo, Colo.
J. Nicol Vance, M. D., Denver, Colo.
F. E. Waxham, M. D., Denver, Colo.
H. A. West, M. D., Fort Worth, Tex.
Hughes Wood, M. D., Denver, Colo.

far. The number for May, 1899, was the last with which he was actively associated.

Then Mr. Sharpley, having taken his degree and being desirous of turning his energies into other directions, disposed of his interests in the *Gazette* as business manager to another. The liberal policy of the management was immediately changed, and very soon irreconcilable differences between the editorial and business departments arose, as regards questions of business honor and integrity, and the standard which should be maintained for the *Gazette* as a scientific publication. As the result of these differences suspension of publication was determined upon, and the manuscript for the number for November, 1898, was withdrawn from the hands of the printer.

Dr. Mussey sought the climate of Old Mexico, but it was too late. His death from pulmonary hemorrhage occurred there December 29, 1898. The untimely demise of Drs. Mussey and Axtell brings to mind the masterly conception of "Death Staying the Hand of the Young Sculptor."

Of both the *Journal* and *Gazette* it can be said that they have always worked for the upbuilding of the medical profession in these Western states. Their word has always been spoken for the advancement of medical education and the promotion of the public health. They have not failed in their attempt to promote feelings of fraternity among our physicians. They have not been a party to partisan strife. Their columns have never been open to unpleasant personalities, while many a cheering and approving commendation has appeared therein.

Their pages have been free from the commercial character by which some of its confreres have not been untainted. They have not placed before their readers "original clinical reports," the sole commendation of which was the demand for publication made in advertising contracts, but they have brought forward monthly the best thought of our medical men uninfluenced by sordid interests.

With Dr. Axtell's death the *Journal* came into my hands. No change of policy has been contemplated. It is to be considered the personal organ of the present editor only in so far

as he is responsible for the acceptance for publication of what appears in its pages.

An earnest endeavor will be made to avoid all tendency to partisanship, either as regards local medical institutions or local medical political factions. No barriers will be raised between the *Journal* and them except such as they may themselves erect. Equal cordiality will be exhibited and equal friendship manifested so far as permitted.

In no case will its utterance be directed by malice or dictated by commercialism.

List of Members.

Date.		
1900	Alexander, G. E.	Castle Rock
1898	Allen, J. Q.	Montrose
1894	Ambrook, Mary L.	Boulder
1873	Anderson, B. P.	Colorado Springs
1886	Arbogast, B. A.	Breckenridge
1892	Ashbaugh, A.	Central City
1896	Ashley, Wm. W.	Ouray
1900	Atcheson, G.	Idaho Springs
1894	Bagot, W. S.	Denver
1898	Baird, W. J.	Denver
1898	Baker, J. A.	Florence
1901	Baker, W. T. H.	Pueblo
1897	Ballin, M.	Leadville
1892	Bane, W. C.	Denver
1895	Beatty, J. T.	Highlands
1897	Beggs, Wm. N.	Denver
1892	Bellrose, Norman W.	Eaton
1898	Bennett, A. L.	Denver
1897	Bergtold, W. H.	Denver
1894	Black, J. A.	Pueblo
1901	Black, H. A.	Pueblo
1892	Black, Melville	Denver
1895	Blaine, J. M.	Denver
1879	Blickensderfer, J. C.	Denver
1888	Boice, John	Denver
1888	Bonnet, W. M.	Denver
1892	Bonney, S. G.	Denver
1894	Boyd, E. T.	Leadville
1895	Brasher, Lewis B.	Denver

1895	Brown, Elizabeth E	Denver
1895	Buchtel, W. H	Denver
1896	Bull, F. B	Kiowa
1894	Bull, H. R	Grand Junction
1900	Burke, Marion	Colorado Springs
1894	Burns, T. M	Denver
1896	Burns, Horace R	Louisville
1899	Burroughs, J. A	Asheville, N. C.
1901	Busey, A. P	Pueblo
1895	Calhoun, A. W	Denver
1897	Call, Chas. H	Greeley
1892	Campbell, W. A	Colorado Springs
1901	Campbell, W. H	Pueblo
1883	Carlin, P. V	Denver
1895	Carrier, F. N	Canon City
1898	Carver, W. B	Denver
1898	Chapman, W. S	Rouse
1897	Chenoweth, M. S	Elbert
1894	Chipman, J. C	Sterling
1889	Clark, J. L	Denver
1898	Clark, L. G	Glenwood Springs
1897	Cline, J. W	Georgetown
1894	Cochems, F. N	Salida
1899	Coffman, F. R	Minturn
1901	Cohen, H. M	Victor
1900	Cole, J. H	Leadville
1898	Coleman, J. F	Montrose
1899	Coman, L. Z	Boulder
1898	Condon, J. F	Breckenridge
1894	Conroy, C. P	Denver
1890	Coover, D. H	Denver
1882	Corwin, R. W	Pueblo
1883	Craig, W. B	Denver
1878	Craven, T. H	Canon City
1901	Cattermole, G. H	Boulder
1901	Cundy, W. A	Denver
1894	Davis, W. B	Pueblo

1892	Davis, W. C	Denver
1895	Davis, W. H	Denver
1899	Dayton, D. F	Trinidad
1894	Dean, M. H	Glenwood Springs
1874	Denison, Chas	Denver
1899	Denney, R. H	Elbert
1895	Delehanty, Edward	Denver
1887	Dorland, W. L	Pueblo
1898	Dow, W	La Junta
1894	Durbin, L. T	Denver
1897	Edson, Carroll E	Denver
1891	Elliott, John F	Idaho Springs
1899	Elliott, H. R	Denver
1871	Elsner, John	Denver
1885	Eskridge, J. T	Denver
1897	Espey, John R	Trinidad
1890	Exline, J. W	Denver
1899	Farnsworth, J. A	Littleton
1901	Ferris, Charles A	Denver
1895	Fierstone, J. L	Denver
1888	Finney, Frank	La Junta
1897	Fischer, P. W	Walden
1882	Fisk, S. A	Denver
1891	Fleming, C. K	Denver
1885	Forhan, T. J	Trinidad
1891	Foster, John M	Denver
1895	Freeman, Leonard	Denver
1896	Freeman, Russell B	Denver
1898	Friend, F. M	Lamar
1898	Gale, J. A	Denver
1897	Gallaher, T. J	Denver
1885	Galloway, B. S	Leadville
1888	Gardiner, C. F	Colorado Springs
1897	Garnett, A. H	Colorado Springs
1894	Gilbert, Bartlett	Silver City, N. M.
1893	Gildea, P. F	Colorado Springs
1901	Godsman, P. B	Burlington
1898	Graham, C. A	Denver

1879 Graham, J. W.....Denver
1885 Graham, R. F.....Greeley
1890 Grant, W. W.....Denver
1898 Grass, J.....Trinidad
1898 Greedy, F. A.....Denver
1880 Greene, J. L.....Minturn
1896 Griffith, Benj. F.....Leadville
1884 Hall, J. N.....Denver
1900 Hally, C. R.....Fort Collins
1896 Hamilton, George.....La Jara
1898 Hamly, L. B.....Salida
1901 Hanford, P. O.....Colorado Springs
1901 Hanson, K.....Grand Junction
1888 Harrison, M.....Boulder
1889 Hart, James A.....Colorado Springs
1894 Harvey, H. G.....Denver
1892 Haskins, B. F.....La Junta
1885 Hassenplug, G. K.....Denver
1898 Hasty, J. G.....Lamar
1879 Hawes, Jesse.....Greeley
1880 Hawkins, T. H.....Denver
1895 Heath, Lillian.....Rawlins, Wyo.
1897 Heimberger, D.....Leadville
1893 Hershey, E. P.....Denver
1894 Hickey, C. G.....Denver
1893 Higgins, J. W.....Denver
1895 Hill, E. C.....Denver
1899 Hillkowitz, P.....Denver
1901 Hock, William R.....Pueblo
1898 Hoffman, D. S.....Lake City
1901 Hoffman, O. W.....Denver
1901 Holden, G. W.....Denver
1892 Holmes, A. M.....Denver
1898 Holmes, W. E.....Gunnison
1894 Hopkins, S. D.....Denver
1875 Horn, T. G.....Colorado Springs
1898 Hotopp, Theo.....New Castle
1894 Howard, E.....Denver

1897	Hubbell, S. J	Fort Lupton
1886	Hughes, T. A	Denver
1897	Hutchings, R. K	Colorado Springs
1892	Hutchinson, J. Cooper	Denver
1898	Ingersoll, L. F	Grand Junction
1895	Jackson, Edward	Denver
1898	Jackson, F. A	Salida
1895	Jaeger, Charles	Denver
1898	James, F. E	Estes Park
1898	Jay, M	Gunnison
1884	Jayne, W. A	Denver
1896	Jeannotte, J. A	Leadville
1895	Jefferson, B. L	Hayden
1895	Jeffery, Alicia F	Denver
1900	Johnson, B. I	Denver
1897	Johnson, Dryden	Antonito
1898	Johnson, H. R	St. John's, Ariz.
1895	Johnson, J. E	Kokomo
1899	Kahn, Maurice	Leadville
1891	Kahn, Sol G	Leadville
1893	Keith, John G	Leadville
1884	Kelly, J. P	Golden
1896	Kemble, L. H	Denver
1896	Kickland, W. A	Fort Collins
1890	King, A. T	Pueblo
1897	Kinney, J. E	Denver
1892	Kleiner, M	Denver
1895	Lake, E. F	Denver
1891	Law, G	Greeley
1896	Law, John	Leadville
1889	Leavitt, B. C	Denver
1882	Lee, E. A	Fort Collins
1873	Lemen, L. E	Denver
1892	Le Mond, R. F	Denver
1887	Levy, Robert	Denver
1901	Lord, H. Aaron	Crestone
1891	Liebhardt, Laura L	Denver
1895	Liggett, Wilbur T	Cripple Creek

1896 Little, W. T. . . . . Canon City
1898 Littrell, R. S. . . . . Rye
1891 Lobingier, A. Stewart. . . . . Denver
1898 Lockhard, W. G. . . . . New Castle
1901 Libby, G. F. . . . . Colorado Springs
1896 Love, Minnie C. T. . . . . Denver
1896 Lucy, Daniel R. . . . . Denver
1888 Lyman, C. B. . . . . Denver
1898 Mackintosh, N. . . . . Gunnison
1898 Macalester, R. K. . . . . Glenwood Springs
1881 Maclean, A. M. . . . . Leadville
1901 Macomber, E. K. . . . . Delta
1896 Macomber, G. N. . . . . Denver
1898 Mafan, T. . . . . Salida
1896 Mann, Alfred . . . . . Denver
1901 Marmaduke, C. V. . . . . Pueblo
1901 Mayhew, D. P. . . . . Colorado Springs
1901 Mayne, O. J. . . . . Como
1893 Melvin, J. Tracy. . . . . Saguache
1892 Miel, George W. . . . . Denver
1901 Miller, John S. . . . . Denver
1900 Mitchell, Elsie R. . . . . Denver
1897 Mitchell, William C. . . . . Denver
1894 Moulton, G. H. . . . . Demerara, British Guiana
1896 Mugrage, S. G. . . . . Denver
1891 Munn, W. P. . . . . Denver
1901 Murray, John A. . . . . Denver
1896 McCreery, R. L. . . . . Magallon, N. M.
1900 McClanahan, Z. H. . . . . Colorado Springs
1894 McDermith, S. T. . . . . Denver
1894 McDonald, A. J. . . . . Leadville
1894 McDonald, W. J. . . . . Rocky Ford
1897 McDowell, U. D. . . . . Longmont
1899 McFadden, J. G. . . . . Loveland
1892 McHugh, P. J. . . . . Fort Collins
1898 McKelvy, W. . . . . Breckenridge
1895 McKenzie, George . . . . . Victor
1884 McLauthlin, H. W. . . . . Denver

1900	McMullin, Smith	Castle Rock
1891	McNaught, F. H	Denver
1895	Neuman, Daniel	Denver
1896	Nichols, Charles B	Fort Wingate, N. M.
1894	Nickerson, W. M	Denver
1882	O'Connor, J. W	Denver
1899	Oettinger, B	Denver
1899	Orr, C. S	Alamosa
1898	Otis, W. D	Fort Morgan
1890	Packard, George B	Denver
1898	Packard, W. A	Monte Vista
1885	Parkhill, Clayton	Denver
1895	Peavey, Josephine L	Colorado Springs
1895	Pennock, V. R	Cripple Creek
1887	Perkins, I. B	Denver
1894	Perkins, J. M	Denver
1890	Pershing, H. T	Denver
1885	Pfeiffer, O. J	Denver
1882	Phillips, G. W	La Junta
1901	Pillsbury, L. B	Primero
1898	Porter, F. R	New Windsor
1898	Prewitt, F. E	Durango
1895	Powers, Charles A	Denver
1893	Powers, J. J	Denver
1895	Purcell, J. W	Denver
1897	Reed, W. W	Fowler
1901	Richmond, C. B	Denver
1900	Riley, W. H	Boulder
1882	Rivers, E. C	Denver
1896	Roberts, Una G	Denver
1887	Robinson, A. J	Aspen
1898	Robinson, A. L	Glenwood Springs
1889	Robinson, J. R	Colorado Springs
1898	Robison, M. A	Victor
1898	Roehrig, G. F	Denver
1883	Rogers, E. J. A	Denver
1898	Rogers, F. E	Littleton
1884	Rothwell, E. J	Denver

1884	Rothwell, P. D	Denver
1889	Rothwell, William J	Denver
1899	Rucker, P. T	Basalt
1901	Sanford, J. B	Castle Rock
1901	Sandborn, M. J	Brookside
1895	Sawins, A. H	Denver
1893	Seebass, Alfred R	Denver
1891	Sewall, Henry	Denver
1887	Shollenberger, C. F	Denver
1895	Shotwell, W. E	Denver
1895	Sigman, H. G	Rocky Ford
1896	Simon, Saling	Denver
1897	Singer, W. F	Pueblo
1893	Sirois, E	Denver
1898	Smith, F. M	Holyoke
1898	Smith, J. Sol	Denver
1901	Smith, John W	Crestone
1898	Smith, W. W	Erie
1892	Snitcher, H. C	Denver
1875	Solly, S. E	Colorado Springs
1901	Solenberger, A. R	Colorado Springs
1896	Spivak, C. D	Denver
1895	Spratlin, P. E	Denver
1871	Stedman, A	Denver
1898	Stephenson, W. C	Florence
1899	Stevens, E. W	Denver
1895	Stiver, Thomas J	Denver
1894	Stover, George H	Denver
1879	Strickler, W. M	Colorado Springs
1892	Stuver, E	Fort Collins
1898	Sumner, C. O	Fairplay
1896	Taussig, Arnold S	Denver
1891	Taylor, Hugh L	Denver
1889	Taylor, T. E	Denver
1901	Taylor, A. G	Grand Junction
1878	Thombs, P. R	Pueblo
1894	Thompson, David	Denver
1896	Thorp, R. L	Denver

1898	Thrailkill, G. H	Gerard, Kan.
1898	Trovillion, E. B	Gold Hill
1892	Tucker, Beverly	Colorado Springs
1901	Turner, W. E	Brush
1897	Tyler, G. E	Denver
1892	Van Meter, S. D	Denver
1899	Van Zant, C. B	Denver
1891	Vroom, J. N	Denver
1899	Warren, H. E	Denver
1893	Waxham, F. E	Denver
1896	Wetherill, H. G	Denver
1901	Wheaton, C. L	Denver
1888	Whitney, H. B	Denver
1901	Whitmore, E. A	Leadville
1896	Wiest, Sard	Longmont
1900	Wilcox, H. W	Silver Plume
1900	Wilder, J. A	Denver
1899	Williamson, A. H	Denver
1898	Williams, C. W	Manzanola
1895	Williams, T. J	Leadville
1889	Work, Hubert	Pueblo
1901	Williamson, W. A	Rockvale
1874	Wilson, W. E	Denver
1887	Worthington, A. K	Denver
1901	Wrightsman, John B	Mancos
1897	Zederbaum, Adolph	Denver

HONORARY MEMBERS.

Date.		
1880	*O. D. Cass, M. D.	
1873	*Hon. John Evans, M. D.	Denver
1889	*Thos. F. Rumbold, M. D.	St. Louis, Mo.
1879	D. H. Dougan, M. D.	Denver
1895	Prof. John Ridlon, M. D.	Chicago, Ill.
1895	Prof. Frank Norbury, M. D.	St. Louis, Mo.
1895	Prof. Victor C. Vaughan, M. D.	Ann Arbor, Mich.
1899	Robert H. Babcock, M. D.	Chicago, Ill.
1899	John B. Roberts, M. D.	Philadelphia, Pa.
1900	H. A. Lemen, M. D.	Denver
1900	W. R. Whitehead, M. D.	Denver
1900	*W. F. McClelland, M. D.	Denver
1900	F. J. Bancroft, M. D.	Denver
1900	C. K. Mills, M. D.	Philadelphia, Pa.
1900	C. B. Nancrede, M. D.	Ann Arbor, Mich.
1900	Lieutenant-Colonel H. Lippincott, M. D.	U. S. A.
1901	W. M. Strickler, M. D.	Colorado Springs

*Deceased.

Total active membership. 327

DECEASED MEMBERS.

NAME	Year Elected	Age	Residence at Death	Date of Death	MEDICAL COLLEGE	Year Grad.
Lionberger, D. B.	1872		Denver	1873		
Davis, S. B	1873		Central City	1875	Rush Medical College University Medical College, N. Y.	1865 1866
Johnson, G. L	1874		Denver	1875	Medical Department Iowa University	1872
LeCarpentier, Jules	1875		Fairplay	1876	University Paris	1865
Davis, M. J	1872		Golden	1876		
Thacker, W. H	1871		Denver	1876	Medical Department University Michigan	1862
Boone, S. H	1873		Denver	1877	University of Louisville, Ky	1857
Lansingh, K. V. R	1876		Denver	1879	Albany Medical College	1870
Dickinson, J. S	1871		Denver	1879	Royal College Surgeons, England	
Taylor, R. T	1873		Leadville	1882		
Gambell, F. W	1881		Leadville	1882	Detroit Medical College	1873
Warn, W. H	1879		Denver	1882	College Physicians and Surgeons, N. Y	
Wilson, M, A	1880		Denver	1882	Ohio Medical College	1866
Craven, J. S	1880		Pueblo	1884	Iowa State University, Medical Department	1867
Griffith, D. S	1882		Durango	1886	Jefferson Medical College	1863
Mavity W. K	1884		Denver	1886	Jefferson Medical College	1865
McMurtrie, G. S	1873	61	Denver	August, 1887	University Pennsylvania, Medical Dept	1860
Buckingham, R. G	1871	73	Denver	March 18, 1889	Berkshire Medical College	1836
Lathrop, Charles C	1877	36	Denver	May 28, 1889	Bellevue Hospital Medical College	1875
Fay, William M	1883	33	Denver	January 13, 1889	Kansas City Medical College	1881
Brumond, P. B	1884		Idaho Springs	September 13, 1889	Chicago Medical College	1868

Grimes, W. S.	1883	....	Denver	December, 21, 1889...	Miami Medical College	1857
James, H, C	1881	50	Ouray	January 4, 1890	Jefferson Medical College	1870
Wooster, David	1888	37	Idaho Springs	April 8, 1891	Medical Department University of Cala	1885
Keables, E. H	1888	71	Alma	January 6, 1892	Bellevue Hospital Medical College	1861
Cory, J. B	1883	54	Denver	January 24, 1892	Medical Department University of Michigan	1862
Worthington, R. H	1884	46	Denver	May 13, 1892	Medical Department University of Denver	1884
Parker, C. M	1873	54	Denver	August 12, 1892	University of Louisiana / Medical College of Virginia	1859 / 1862
Wicks, E. G	1889	34	Denver	August 26, 1892	Medical Department University of Maryland	1888
Davis, J. C	1890	66	Zurich, Switzerland	October 8, 1892	Castleton Medical College	1847
Steele, H. K	1871	68	Denver	January 20, 1892	University City of New York	1848
Williams, W. H	1871	53	Denver	March 15, 1893	University of Louisiana	1867
Keating, J. M	1892	42	Colorado Springs	November 18, 1893	University of Pennsylvania	1873
Finfrock, J. H	1885	....	Boise City, Idaho	February, 1884	Medical College of Ohio	1863
Tucker, B. St. George	1880	55	Colorado Springs	March 30, 1894	University City of New York	1860
Reed, Charles M	1894	24	Dotsero, Colo	September 29, 1894	University of Louisville	1892
Scully, D. J	1893	33	Lindsay, Ontario	April 21, 1895	McGill University	1887
Powers, J. W	1092	37	Salt Lake City	March 25, 1895	Rush Medical College	1885
Jenner, C. W	1891	55	Denver	August 11, 1895	Western Reserve Medical College	1882
Adams, B. F. D	1888	....	Colorado Springs	October 28, 1895	Harvard Medical School	1862
D'Avignon, F. F	1880	49	Leadville	November 6, 1895	McGill University	1871
Rose, Edward P	1892	40	Salt Lake City	November 6, 1895	South Carolina Medical College	1878
Manly, Chas. S	1892	29	Denver	November 13, 1895	Medical Department Denver University	1891
Bosanko, S. Arthur	1885	39	Leadville	November 23, 1895		
Fearing, Sarah J	1895	38	Denver	January 11, 1896	Woman's Medical College, Philadelphia	1890
Cattanach, A. J	1889	49	Denver	May 30, 1896	McGill University, Montreal	1871

DECEASED MEMBERS—*Concluded.*

NAME	Year Elected	Age	Residence at Death	Date of Death	MEDICAL COLLEGE	Year Grad.
Reed, Jacob Jr.	1877	57	Colorado Springs	December 15, 1896	Jefferson College, Pennsylvania	1866
Morgan, Anna E.	1892	....	Denver	January 23, 1896	Medical Department Denver University	1892
Mager, Hugo	1895	46	Denver	July 18, 1897	Northwestern Medical College	1883
Willard, J. J.	1894	36	Pueblo	March 29, 1898	University of Vermont	1888
Crouch, H. C.	1892	40	Denver	April 20, 1898	University of Goettingen	1890
Herrick, J. C.	1891	55	Denver	September 30, 1898	Yale and Long Island College Hospital	1865
Dawson, J. W.	1878	51	Canon City	January 8, 1899	Rush Medical College	1871
Kahn, Lee	1892	31	Leadville	February 26, 1899	Rush Medical College, Chicago, Ill	1889
Axtell, Edwin R.	1892	33	Denver	December 15, 1899	Miami Medical College, Cumberland	1888
Burleigh, Geo. W	1896	30	Boulder	October 28, 1899	University of Michigan	1894
Wood, L. H	1885	52	Denver	September 5, 1899	Yale Medical School	1869
Hazlett, H. F.	1896	33	Pueblo.	March 4, 1900	Jefferson Medical College	1892
Liggitt, R. D.	1898	....	Mosca	1899-1900	Toledo Medical College	1884
Maffett, L. O.	1897	41	Colorado Springs	April 6, 1900	Medical College of Ohio	1865
McAlister, S.	1898	....	Rocky Ford	1899-1900	University of Verment	1895
McClelland, Wm. F.	1871	....	Denver		Jefferson Medical College, Philadelphia	1849
Rumbold, T. F.	....	....	St. Louis			.....
Clark, John K.	1890	....	Denver		Missouri Medical College	1882

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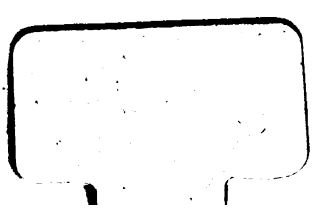
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